Railway Age
AND RAILWAY REVIEW

FIRST HALF OF 1928—No. 13 MARCH 31, 1928 SEVENTY-THIRD YEAR

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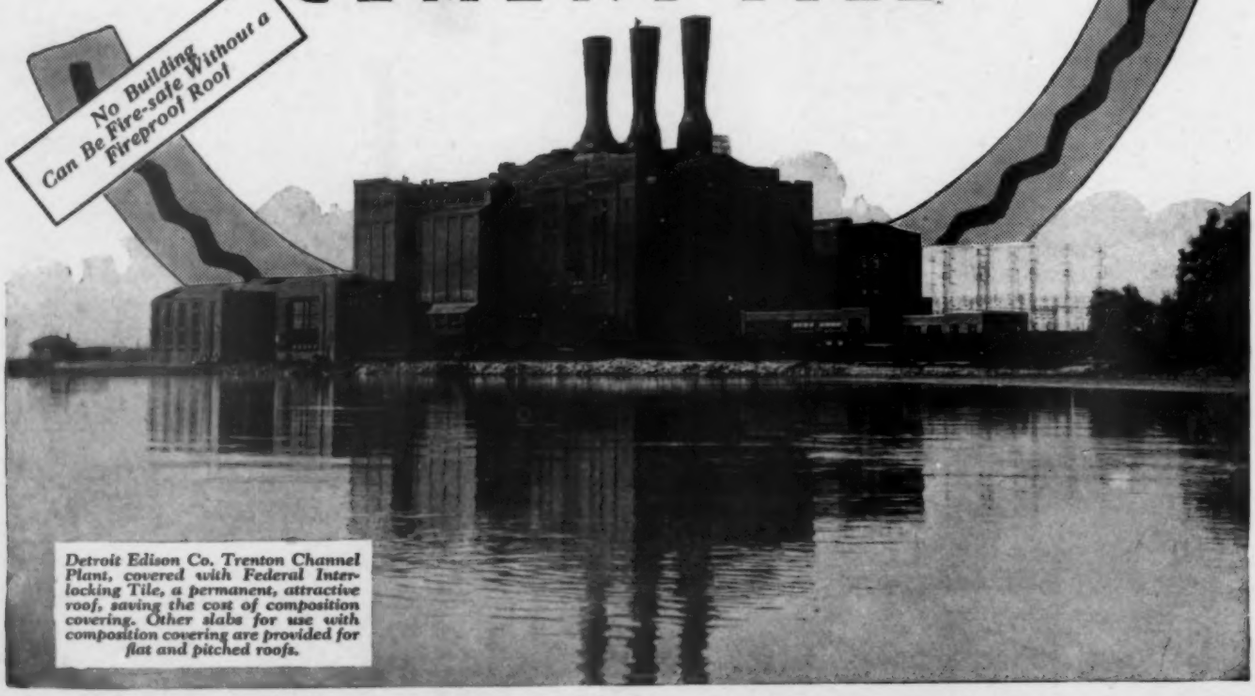

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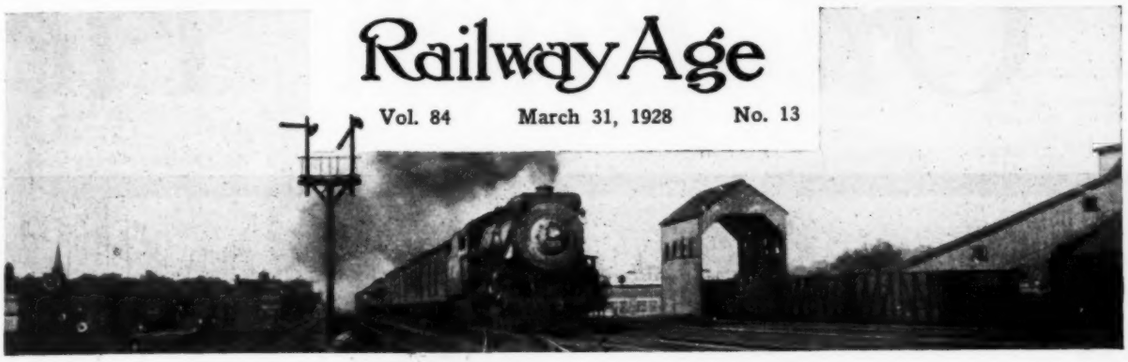

N. Y., N. H. & H. Gilt Edge Express at Forest Hills, Mass.

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Railway Age

Vol. 84, No. 13 March 31, 1928

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An Enviable Record

ADVANCE in the art of railroad construction has been such a gradual process that it takes some outstanding achievement to center attention on the contrast between the methods of the present and those of pioneer days. A performance well worthy of distinct record, is that of the Chesapeake & Hocking, a subsidiary of the Chesapeake & Ohio, in the construction of a 63-mile double-track main line in 294 days. As described elsewhere in this issue, the project involved 4,600,000 cu. yd. of grading, which, taking into account a loss of 45 days on account of rain, required the excavation, moving and placing of an average of 18,500 cu. yd. of earth and rock on every available working day. But as is well known to everyone conversant with the exigencies of grading operations, such an average performance can be attained only by the development of a maximum rate of output of considerably more than double this amount. This record is not simply the result of the concentration of an unusual number of complete modern grading outfits on the work, but must be accounted for in large part by careful planning, a highly perfected organization, and the anticipation of contingencies before they happen. It is an outstanding example of engineering skill and efficient railway management.

Something New in Annual Reports

THE SOUTHERN RAILWAY has issued its annual report for 1927 in a new and interesting form. The trends of traffic and earnings are analyzed succinctly, interestingly and in non-technical language and each important development is illustrated with charts. These charts are numerous and are not too complex. They are placed in the text adjoining the details which they illustrate. Thus the reader has the facts presented to him in figures and by charts in close juxtaposition, and his understanding is thereby facilitated. Moreover, the style of this report is narrative, rather than static, conveying the idea of development rather than treating the year as stationary. Subjoined to the report are two tables—and two only—one giving profit and loss details and the other the balance sheet. These statements, however, differ from those usually met with in that the categories are described, rather than merely labeled. "Financial results for the year" is used instead of "profit and loss account". "Financial position at the end of the year" replaces the term "balance sheet". In the "financial results" statement the first two items read:

> "The Company received from freight, passenger and other miscellaneous operations a total revenue of.....
> "The cost of maintaining the property and of operating the railroad was....."

These completely explanatory terms are used throughout, so that both the statements can be easily understood by any intelligent reader, regardless of whether he is accustomed to reading matter of this kind or not. For the benefit of those stockholders who may wish a detailed report in the usual form, the company has prepared another edition following more conventional lines which it will supply if desired. Many railroads in the past few years, increasingly cognizant of the importance to them of greater public understanding, have directed their efforts toward making their annual reports more informative and attractive to the average reader. The Southern is to be congratulated on carrying this improvement a step farther. The report is reprinted in this issue, following in general the original style, in advertising pages adjacent to the financial news columns.

Progress of Foreman Training

A REPORT on the growth of foremanship courses in the United States has recently been compiled by the Department of Manufacture of the Chamber of Commerce of the United States. It shows a remarkable extension in the number of these courses during the past three years. In 1924 there were 105 such courses; this increased to 324 in 1926 and to 933 for the season ending June, 1927. While some of these groups have not functioned efficiently, or have failed, most of them have proved so successful that there is now a definite tendency, according to the report, to "place foremanship training on an organized and permanent basis; not one course and then forgotten, but continuous from year to year." Of the 933 courses conducted in 1927, 49 were on railroads or in railroad repair shops. In a number of instances railroad supervisors joined with representatives of other industries in their section, so that this figure does not adequately measure the activities along foremanship training lines on the railroads. Although it is not stated in the report it is interesting to note that in the railroad field, at least, most of these foremanship training groups have been formed on the initiative of the foremen themselves. It is noteworthy, also, that many of these foremanship training developments have gone hand in hand with progress in employee and apprentice training. An excellent reason for this was given by R. H. Beauchamp, special representative of the vice-president of operation of the Union Pacific Lines in a recent address before the American Vocational Education Association at Los Angeles, Cal. He made the following significant statement: "Every supervisor should be an educator, and industry is learning that one of the principal requisites of the supervisor is the ability and will to educate and train those under his supervision. No training plan will ever be successful unless it has the sympathetic interest and active co-operation of the supervisor. And to create and secure this

interest and co-operation, he must be made to feel that he is not only responsible for discipline of apprentices, but is, in fact, one of the most important members of the teacher faculty. From this statement I believe you will understand why we have been sold to the idea of foremanship training."

Comfortable Seats for the Day-coach Passenger

APPEARING elsewhere in this issue is a brief article describing a day-coach that was recently remodeled and equipped with seats of new design for the Delaware, Lackawanna & Western. This car, which has been placed in service on the Lackawanna Limited, between Buffalo, N. Y., and Hoboken, N. J., was remodeled for the express purpose of determining the reaction of the day-coach passenger toward more comfortable riding facilities. The seats are of a design similar in many respects to those used by the Baltimore & Ohio in its day-coaches between New York and Washington. One of the illustrations shows two passengers occupying adjacent seats. It so happens that the two people represent, in many respects, the two extremes in the height of adult passengers. The gentleman is nearly six feet in height. The seat backs are of sufficient height to provide complete support for the back and a rest for the head. The lack of these features in passenger coach seats has been one fault for which many travelers have offered severe criticism. This is an excellent example of the careful study which is justified in an effort to provide comfortable seating facilities for day-coach patrons.

Are Repair Shops Protected Against Fire?

THE management of an eastern railway is making a survey at its principal car and locomotive repair shops with the intention of having an automatic fire alarm and sprinkler system installed. This measure is being taken for several reasons. This road is carrying out the policy of closing and permanently abandoning many of its outlying repair points and concentrating the repairs at the main repair shops—a policy which is being more or less followed by a number of other railroads. Under such conditions, if a serious fire should occur at the main shop the maintenance of equipment program would be seriously affected. Experience with a wood mill fire several years ago indicated how serious such an event may prove; the mill has been rebuilt and is now protected by an automatic fire alarm and sprinkler system. Not only is the loss of use of the repair facilities involved in a fire serious, but the cost of replacing expensive machinery and destroyed cars and locomotives must be considered. The recent disastrous fire at the Glenwood shops of the Baltimore & Ohio is an example of the extent to which rolling stock may be involved in a fire. Another factor is the question of fire insurance. The blacksmiths' fire, the use of welding equipment, firing up locomotives, the blow torch and many other forms of fire are all potential causes of a conflagration in the shops. As a result the insurance rates are high. By installing a sprinkler system, the insurance rates will be reduced, which reduction in the case mentioned, is expected eventually to pay for the cost of its installation. It is true that many roads do not carry insurance, preferring to carry the risk themselves—a policy which is favored by the widely scattered locations of railroad property. The difference in the risk indicated by the difference in rate effected by the sprinkler system, however, should in the end prove as profitable to such roads as to those who carry outside insurance. Railway office buildings of any importance are usually protected against fire by sprinkler systems. Should these buildings be considered more important than central repair shops? Is it not true that if a large office building were destroyed by fire, the road could continue to operate smoothly, which it could not do if a large repair shop were destroyed by fire?

New Bill for Interstate Motor Transport Control

REPRESENTATIVE PARKER has introduced in Congress a new bill, H. R. 12380, to regulate interstate motor vehicles. It is much less comprehensive than his earlier bill (see *Railway Age*, Motor Transport Section, January 28, page 281). However, the new bill has one important feature which the earlier one did not have—namely a greater degree of support from the various interests involved. The bill represents a compromise agreement arrived at by representatives of the American Railway Association, the American Electric Railway Association, the state commissions and the Bus Division of the American Automobile Association. They will support it, although there may be some individual reservations.

The proposal restricts itself to interstate common carrier highway passenger service. It requires that all operations included in its scope shall secure certificates of convenience and necessity either from the Interstate Commerce Commission or from boards named by the state commissions involved, acting in behalf of the commission. Standardized accounting, adequate service, reasonable rates and financial responsibility in case of accident are provided for.

The bill is, we believe most railroad men will agree, far from perfect. There is no specific provision to facilitate the co-ordination of motor coach service with rail service. Freight service is not even considered. Moreover, it includes a most questionable feature in its "grandfather clause" which requires the automatic issuance of certificates to those interstate motor coach lines which have been in continuous "bona fide operation" at least one year prior to the opening day of the session of Congress which enacts this bill. This, it seems to us, provides a rather infantile "grandfather". Examiner Flynn of the Interstate Commerce Commission in his report on motor transport regulation advocated setting the "grandfather" period back to March 2, 1925, the date when the Supreme Court ended state supervision of interstate operations Said the Examiner:

> "Prior to that date interstate operators, in general, had submitted to the regulation exercised by the states, and it is a fair presumption that such operations were in good faith. In view of the large number of interstate operations which sprang up in all sections of the country within a short time after that date, no such presumption can be fairly indulged in with respect to operations instituted at later dates."

That statement, it seems to us, is sober truth, which none but those selfishly interested would try to controvert. However, to hold out for conditions which, while just, would tend to arouse great opposition is to endanger the early passage of any legislation at all. And securing some regulation and stability in the interstate

motor coach field as soon as possible is so important that it outweighs any objections which may be raised to details of the new Parker Bill. Railroad men who will familiarize themselves with its terms and will endeavor to secure public support to insure its early passage will, we believe, be acting in the best interests of the public and of the transportation industry in general.

Structural Arc Welding Enters the Bridge Field

FUSION welding is gradually finding an increasing number of applications in the field of structural engineering, the most recent of which are two all-welded railroad bridges, one a 62-ft. through girder span at Turtle Creek, Pa., and the other a through truss span, 134 ft. 8 in. long, at Chicopee Falls, Mass. The latter, which holds the greatest interest for railway engineers, was described in detail in last week's issue.

Structural engineers will undoubtedly criticize the design of the Chicopee Falls bridge, because it embodies many marked deviations from practices that have long been accepted as standard in this field. But it is well for them to bear in mind that details of construction which have been found most suitable for riveted connections may not be necessary for welded work. Present practice in structural design represents the results of years of study and experience and it will be necessary for fusion welding, as applied to structural steel, to undergo an extended period of development before an equivalent technique can be built up. One phase of the problem includes a careful survey of present standards of rolled shapes for the purpose of ascertaining if these lend themselves as effectively to welded connections as they do to the riveted joints for which they were designed.

The designers of the Chicopee Falls bridge were engaged in pioneer work and had to employ those available structural shapes which most nearly met their needs; they displayed commendable resourcefulness and ingenuity in meeting the many problems which confronted them. For example, welded connections between stringers and floor beams, because of their greater rigidity than riveted joints, permitted of no alternative but to consider these connections as fixed, with the result that they were designed to take full negative moments.

Advocates of fusion welding in structural steel point to many advantages over riveted construction, the most important of which is the reduction in weight made possible by a simplification of connections. Thus, in the Chicopee bridge it is claimed that the structure as built is one-third lighter than that of a corresponding design in riveted construction.

This statement would be more convincing if the bridge as built conformed more nearly to accepted practice in such details as sway bracing. The absence of effective portals is the first defect to strike the critical eye of the structural engineer.

Another advantage cited is a reduction in the cost of drawing room and shop work through the simplification of the details of connections, primarily in the elimination of punching and reaming. The savings to be effected through this means cannot be determined without a careful study which will take into account such items as the requirements for temporary bolted connections in erection, changes in current tolerances in the lengths of plain material and possible increases in the need for milled ends.

The strength of fusion welds is thoroughly established and welding is commonly accepted in many lines of industry, but the introduction of welding in the field of structural engineering, particularly as applied to bridges, will be retarded by the conscientious conservatism of the bridge engineer, which is best illustrated by his attitude toward riveted connections. The strength of these has been established for many years, yet no duty imposed on the inspector of bridge erection receives greater emphasis than that of checking the workmanship of riveting to make sure that he will discover all loose rivets and see that they are replaced.

With this matter of the security of joints uppermost in his mind, the bridge engineer who approaches the study of welded structural steel must not only know that fusion welds can be made with a high degree of uniformity in workmanship but also by what means it will be possible for him to check the effectiveness of every connection that is made. To answer this question, and to develop standard details for welded connections in structural steel work, are tasks in which welding and structural engineers have mutual responsibilities.

Passenger Business—A Problem

THE passenger traffic and service of the railways now present one of their biggest and most difficult problems. Total passenger earnings declined almost $70,000,000 in 1927, or about 6.5 per cent. In January, 1928, they were almost 9 per cent less than in January, 1927. These figures are given merely as illustrating that the decline in passenger business which has occurred in almost every year since 1920 is still continuing. Its rate of decline in the country as a whole was reduced for a few years by the large amount of travel in the southeast caused by the Florida boom, but recently the southern lines have been suffering with those in other territories from losses of passenger business.

The reductions in passenger service have been nowhere near commensurate with the decline in traffic. After having increased in both 1924 and 1925, the number of passenger train miles was reduced in 1926 and 1927. In 1927, however, the number of passengers carried one mile was 28 per cent less than in 1920, while the number of passenger train miles was only 3 per cent less. Year by year the average number of passengers carried per train and per car has declined and average earnings per passenger train mile and car mile have, of course, also declined.

The railways in all parts of the country have tried expedients for arresting the decline of traffic or for reducing the operating costs of handling it. A general view of the results makes clear that these expedients however valuable, have been wholly insufficient to prevent the decline in earnings from greatly exceeding the operating economies effected.

This has not been due entirely to the decline of traffic. There is active competition between the railways in rendering passenger service, and unquestionably in many territories and in many ways this competition has been carried to excess. Between many terminals more trains are run than are needed to serve the public adequately and satisfactorily. Here and there non-revenue cars are carried which are of very little use to travelers for the obvious reason that few use them. The unnecessary operating expenses incurred as a result of such excesses of competition could easily be

exaggerated, but undoubtedly there are wastes which could be eliminated without actual impairment of the service.

The problem presented by the continuing decline of passenger business without corresponding reductions of passenger service seems to be one the solution of which can only be found, if there is any solution, by joint study on behalf of the railways as a whole or of the various groups of railways. Individual railways have adopted different and widely separated methods in efforts to arrest the decline of passenger business or to curtail the expense of handling it. It would be helpful to each of them if committees representing all of them, or at least all of those in each group, would assemble all the available information regarding the methods that have been adopted and the results that have been secured. It does seem also that the various groups of railways operating competitive service between the numerous large terminals of the country should jointly study this service and determine if and where it can be curtailed, with resulting economies and without injustice to individual lines or actual impairment of the service rendered to the public.

Meantime, renewed attention apparently must be given to the efforts being made by certain organizations of traveling salesmen to get Congress to pass legislation abolishing the passenger "surcharge." With the passenger business of most railways already unprofitable, and that of practically all railways still declining, those who are again carrying on agitation for legislation by Congress to abolish the sleeping and parlor car "surcharge" are simply seeking to make this branch of railway business still more unprofitable. It is the earnings from freight business which now make it possible for most roads to handle passenger business. Whether the burden now borne by the freight business should be increased to help the railways to handle passenger business yet more unprofitably is the main question presented for Congress to answer by those who are trying to get it to pass a law abolishing the surcharge.

The decline in total passenger earnings from $1,043,950,355 in 1926 to $976,366,124 in 1927 made them the smallest for any year since 1917. The decline in day coach business was 9 per cent, while that in sleeping and parlor car business was only about 3 per cent. The sleeping and parlor car business was larger than in any previous year excepting 1926, which shows that the small decline in it was due to the recession of business activity of all kinds and not to any indisposition of people to incur the cost of riding in sleeping and parlor cars. The amount of travel in sleeping and parlor cars last year was actually 23 per cent greater than in 1921, while the amount of travel in day coaches was 33 per cent less. In 1921 railway travel in sleeping and parlor cars was only 31 per cent of the total, while in 1927 it was more than 45 per cent of the total. If passengers really found the surcharge burdensome travel in sleeping and parlor cars certainly would not have increased as it has during the last six years.

The earnings derived by the railways from the surcharge in 1927 amounted to $40,200,000. In that year they had a decline of almost $150,000,000 in their net operating income and earned an average of only 4.4 per cent on their property investment. The abolition of the surcharge would reduce their net return by the amount of revenue received from it, unless the loss was offset by an equivalent advance in freight rates. To reduce the net return of the railways further would be to imperil their ability to continue to render good and adequate service. Members of Congress who are being bombarded with propaganda for the abolition of the surcharge may well ask those who are bombarding them whether they want to imperil good railway service or make necessary an advance in freight rates in order that freight earnings may contribute more towards defraying the cost of handling an already unprofitable passenger business.

When the railways are threatened with such proposed legislation as that to abolish the surcharge they are usually quick to recognize the fact that they must cooperate in an organized way in defense of their common interests. But there are many other matters besides threatened legislation regarding which they need more organized cooperation. The vice-president in charge of traffic of a large railway system remarked the other day that the conditions resulting from excessive competition in service and rate-making were never worse than now. They really have been much worse, but his remark illustrated the growing realization among railway executive officers of the need for less competition between the railways in ways that impair their net earnings without benefiting the public. It seems very probable that organized study and cooperation with the objects, first, of determining what effective measures, if any, can be adopted to stop the decline of passenger business, and, secondly, of trying to make the service rendered more nearly commensurate with the earnings derived from passenger business, would be fruitful of beneficial results to all the railways, although just how important the results gained would be is wholly conjectural.

The Records of Commissioners

NOW that the tumult and shouting regarding the case of Commissioner Esch have died away there should be frank consideration and discussion, first, of the parts that Congress and the Interstate Commerce Commission should play in railway regulation, and, secondly, of the influences and principles by which the commission should be governed in future. Members of the Senate, having officially executed Mr. Esch for reasons that will not bear scrutiny, can now turn their attention to other exciting matters of apparent political importance. Leaders in transportation and industry must give more thought to the possible effects of the Senate's action in the Esch case because they are more directly concerned with developments affecting the nation's economic welfare.

Congress should adopt general legislation providing that regulation shall be just to both the railways and those who use their service and in accordance with the public interest, and empowering the commission to administer the laws passed. The President should appoint and the Senate should confirm candidates for the commission who are able, unprejudiced and possess special knowledge of economic and transportation matters. As it is the function of the Senate to confirm or reject appointees, it should make whatever investigation it may deem necessary to determine the fitness of an appointee and be governed by its findings. The commission should administer the laws passed by Congress in accordance with their letter and spirit and also with the decisions of the Supreme court interpreting constitutional provisions, which it is bound to assume that Congress intends shall be observed.

The Senate established an extremely bad precendent when it rejected the appointment of Mr. Esch, because it retired him from the commission for his vote in a

single case at the behest of certain interests that were adversely affected by the decision for which he voted. By doing so it set itself up as a supreme court of appeal in this case, although it had not heard the evidence and arguments, and under our theory of regulation is not a fit tribunal to act as a court of appeal in particular cases, any way.

Suppose, however, the question involved had been the much larger one as to whether the commission had been over a period of years regulating the railways in disregard of some very important provision of law, or in disregard of generally recognized constitutional principles, and that a commissioner who had been renominated had favored this policy. Could it then have been seriously contended that it was not the right and duty of the Senate to consider this commissioner's record and to be influenced by it in confirming or rejecting his reappointment?

Records Should Be Considered

Numerous persons who take an active interest in railway regulation seem to think that once a man has served on the commission he should be reappointed as long as he is willing to serve. It seems probable the commission would be much better fitted for intelligent, impartial and constructive regulation if its members, like federal court judges, were appointed for life. As they are not, however, there can be no good reason offered why the general record of each commissioner should not be scrutinized as his term is drawing toward a close in an effort to determine his fitness for further service.

The record made by the commission during the eight years the Transportation Act has been in effect does not indicate that the records of all its individual members could stand such scrutiny. The commission as a whole can easily be convicted of not having administered the rate-making provisions of the act in acordance with their letter or spirit. It has given its own interpretation of these provisions. They direct it to so adjust rates that the railways as a whole, or in such groups as it may divide them into, will be enabled to earn, as nearly as may be, a fair return annually upon their aggregate value. It made a tentative valuation of each group of roads and has held that a fair annual return on this would be 5¾ per cent. It has not so adjusted rates as to enable the railways to earn this return on its own tentative valuation. Furthermore, a majority of its members have adopted principles and methods of railway valuation which are plainly not in accord with the decisions of the Supreme court or even with the provisions of the LaFollette valuation act.

It is the irony of fate that the Senate should have rejected the reappointment of Mr. Esch because he voted for caryying out the Hoch-Smith resolution in accordance with what he believed to be the intent of Congress, but that in the controversy over his reappointment he was not criticized for having voted for the O'Fallon valuation decision or for having failed, so far as the public knows, to make any real effort to get carried out the rate-making provisions of the Transportation Act, of which he was one of the principal authors.

The commission, in defense of the policy it has followed, may point to the fact that railway securities are selling at the highest prices in years; but the commission does not deserve any credit for the low interest rates and extraordinary speculation to which are attributable the present high prices of most securities. The commission may point to the excellence and adequacy of present railway service; but it deserves little or no credit for that. On the other hand, the commission must assume practically all the responsibility for the failure of the railways year after year to earn the net return they would have earned if it had administered the rate-making provisions of the Transportation Act in accordance with its own interpretation of them. Why it persists year after year in regulating the railways unjustly to their security owners and in disregard of the plain language and purpose of the most important provision of the most important law it is charged with administering never has been authoritatively explained. It is apparently due to the radical principles of some of its members and to the timidity of others.

If the members of the commission do not believe the rate-making provisions are sound and should be carried out why do they not say so and tell the reasons for their belief? If they do not now believe that the railways should be allowed to earn 5¾ per cent of the commission's tentative valuation why do they not say so? Why have they been so zealous in trying to give effect to the Hoch-Smith resolution, which is actually not a part of the Act to Regulate Commerce, and so lacking in zeal in trying to carry out the Transportation Act.

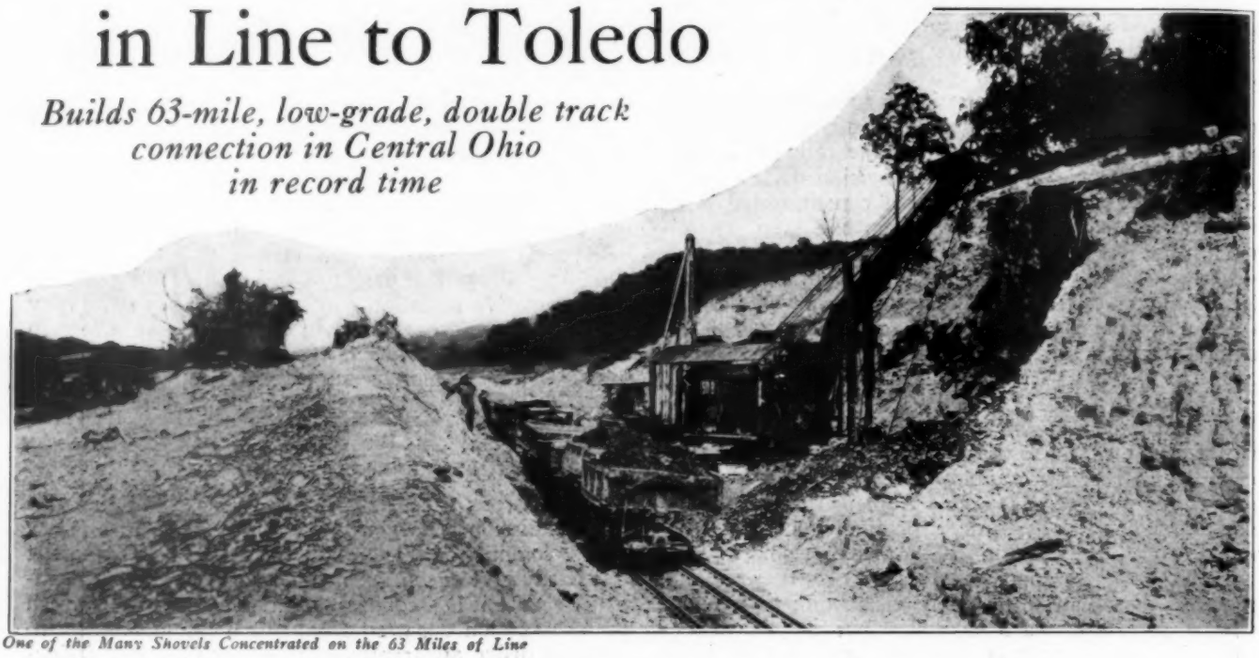
What of the Future?

What effect, if any, the Senate's action in the case of Commissioner Esch will have upon the future policy of the commission is a question of great importance. It can hardy give encouragement to its more radical members because it is a condemnation of a decision in which the commission departed from sound rate-making principles in order, apparently, to assist with reduced freight rates coal mine operators who were paying union wages and for this reason were having difficulty in competing with coal mine operators who were paying non-union wages. The commission's past policy has indicated a desire on the part of some of its members to placate radical public men, but it was not the recognized radicals in the Senate who accomplished the undoing of Mr. Esch. This indicates that possibly radical senators will not be alone on scrutinizing the records of other members of the commission if and when they are renominated. There is no evidence that public sentiment at present favors a radical and restrictive policy of regulation, and therefore there is no assurance that members of the commission who favor such a policy will find in the future that this has enhanced their prestige.

The commission should not be either reactionary or radical. It should regulate the railways. first, in accordance with the laws, and secondly, in accordance with sound economic principles, so far as the laws will permit. It should not refrain from giving a reasonable interpretation and application to the Hoch-Smith resolution as long as it is in effect, but it can hardly be regarded as reactionary to contend that it should, at the same time, give effective application to provisions of law which are more plainly binding upon it and to which the very language of the Hoch-Smith resolution shows that that resolution is subordinate. Now, neither by its own nor any other standard of measurement can it be claimed that the commission has been or is now so regulating rates as to give the railways opportunity to earn a fair return. The Esch case has shown that a member of the commission is just as likely to be subjected to political attack for doing his duty as he sees it as for plainly failing to do it. The moral it seems to suggest is that if the commission shows less regard for the views of radical politicians in future than in the past, and regulates the railways more in accordance with the laws and sound economic principles, its members may have not only the satisfaction of knowing they have done their lawful duty, but also, if attacked, of finding they have vigorous defenders as well as vigorous critics.

C. & O. Completes the Last Link in Line to Toledo

Builds 63-mile, low-grade, double track connection in Central Ohio in record time



One of the Many Shovels Concentrated on the 63 Miles of Line

ON September 16, 1927, the Chesapeake & Ohio started operating trains over a new double-track line extending from Gregg, Ohio, to Valley Crossing, a distance of 63 miles, thereby completing a remarkable record for speed in heavy railway construction. As work on this line was not started until November 25, 1926, the construction period aggregated only 294 days, of which 45 days were lost on account of rain. The work included the moving of 4,600,000 cu. yd. of earth; and 1,080,000 cu. yd. of rock, the placing of 130,000 cu. yd. of concrete and the setting of 10,000 tons of structural steel, in addition to the laying, ballasting and surfacing of 130 miles of track.

The completion of this new line, which was built under the appropriate name, Chesapeake & Hocking, to effect a connection between the end of the Chesapeake & Ohio line at Gregg and its subsidiary, the Hocking Valley, at Valley Crossing, comprises the fulfillment of an objective which has been before the directors of the Chesapeake & Ohio for many years, namely that of having under their complete control a thoroughly effective route for the transportation of coal from the West Virginia fields to the Great Lakes at Toledo. Much of the coal billed for Toledo was delivered to the Cincinnati, Hamilton & Dayton at Cincinnati, or to the Norfolk & Western at Kenova, the latter road turning it over to the Hocking Valley at Columbus.

Develop New Line Further West

In 1914, in compliance with a decision of the United States District Court, the Chesapeake & Ohio disposed of its interest in the Kanawha & Michigan, thereby leaving a gap in its route from the coal fields to the Hocking Valley. To close this gap the Chesapeake & Ohio in 1916 built a line, known as the Chesapeake & Ohio Northern, extending from its own line at Edgington, Ky., across the Ohio River and thence for a distance of 33 miles to a connection with the Norfolk & Western on the east side of the Scoto River opposite Waverly, Ohio. It also secured trackage rights over the Norfolk & Western from this point to a connection with the Parsons yard of the Hocking Valley at Valley Crossing, a short distance south of Columbus.

This route to Toledo, via the Chesapeake & Ohio

Skew Truss Span Over the Norfolk & Western Near Hopetown

Northern, the Norfolk & Western and the Hocking Valley, was an exceedingly valuable one to the Chesapeake & Ohio during the 10 years that it was employed as an outlet for coal to the Great Lakes. However, with the marked increase in the northbound movement of West Virginia, Virginia and Kentucky coal over both the Chesapeake & Ohio and the Norfolk & Western, the joint use of the Norfolk & Western's line between Gregg and Valley Crossing proved unsatisfactory to both carriers, because of the congestion in this neck in the bottle. It imposed a particular handicap on the tenant carrier because the capacity of the line made it necessary to restrict its operations to a maximum of 12 tonnage and 1 time freight trains daily, a limitation that frequently made it necessary to detour a portion of the lake coal via interchange connections at Cincinnati. Furthermore, the use of the Norfolk & Western line with a ruling grade of 0.35 per cent against northbound trains denied the Chesapeake & Ohio the full operating advantage of the 0.2 per cent grade of its own line from the mines to Gregg, as well as over the Hocking Valley from Columbus to Toledo. This state of affairs led to the decision to construct an independent line generally parallel to the Norfolk & Western between Gregg and Valley Crossing, this line being located on a grade of 0.2 per cent against northbound traffic and 0.42 per cent against southbound traffic. By reason of the extremely flat northbound grade it is possible for a 2-8-8-2 locomotive to haul a train of 10,000 tons in the direction of loaded movement, the same locomotive readily hauling the empty movement over the 0.42 per cent grade in the return direction.

South of Salt Creek the Highway Was Placed on a Bench in the Cut Slope

Character of the Country Traversed

The territory traversed by the new line is one covering a wide range of physical characteristics. From Valley Crossing to Kinnikinnick the terrain is one described by Ohio geologists as the Till plains, a fertile rolling farming country with little relief other than occasional glacial moraines. Slopes become more pronounced and differences in elevation increase where these Till plains join the northern edge of a glacial plateau that is traversed between Kinnikinnick and Chillicothe, while south of Chillicothe an unglaciated country presents a much more rugged aspect in which waterways occupy narrow steep sided valleys with marked differences in elevation. Here the geologic strata exposed are primarily of the Waverly formation in which sandstone and Waverly shale predominate.

For the first 16 miles south of Valley Crossing the new line lies adjacent to the Norfolk & Western is a comparatively flat country in which the grading for roadbed is exceedingly light except for embankments at the larger stream crossings. Highway grade separation, as on other portions of this project, was an important factor in the grading quantities; for example in one mile of this portion of the line the yardage in the approaches to a single overhead highway bridge totaled more than three times that required for the rail road roadbed.

The first roadway grading of any consequence encountered south of Valley Crossing is in the vicinity of Hagerty where there is an embankment three miles long of a maximum height of 15 ft., requiring about 200,000 cu. yd. of fill, practically all of which was obtained from side borrow. Heavy work was required through Circleville where the line is located between the town and the Scioto river on an embankment having a height of from 10 to 33 ft. over a distance of 6,000 ft. which contains about 380,000 cu. yd. of fill. While this embankment was necessary to meet the grade line requirements, it also served as a means of separating grades at three streets, two private crossings and a crossing over the Pennsylvania.

South of Circleville the east side of the Scioto River valley rises on a gradual slope to a considerable elevation above the river. In this territory the Norfolk & Western lies high up on this slope whereas the new Chesapeake & Hocking was located closer to the river, at some points as much as three miles from the Norfolk & Western. Because of the greater depth of lateral valleys close to the river this location involved heavier grading, but was selected because it avoids the climb to the higher ground further up the slope; in fact, at one point the new line is 96 ft. lower than the Norfolk & Western.

Heavy Grading

The grading of this portion of the line is heavy and includes a cut 7,000 ft. long with a maximum depth of 35 ft. This portion of the line is largely in a gravel formation, but this runs out south of Kinnikinnick creek where the line is closer to the river in a much more undulating country in heavy clay. The two miles embracing the embankment across the valley of Kinnikinnick creek and the cut immediately south of it are two of the heaviest on the entire line, Mile 33 having 70,900 cu. yd. of excavation and 255,300, cu. yd. of embankment and Mile 34, 254,000 cu. yd. of excavation and 47,000 cu. yd. of embankment.

At Hopetown the line turns away from the river and

crosses over the Norfolk & Western at a summit in the grade line which required an embankment two miles long of a maximum height of 45 ft. and containing 470,000 cu. yd. of fill. In addition to a 198-ft. skew through truss span over the Norfolk & Western, this fill is pierced by a deck girder span over a traction line,

The Chesapeake & Hocking Is the Last Link in the Route from the Mines to the Lakes

four under passes for highways and a 28-ft. waterway arch.

Long Embankment for Overcrossing

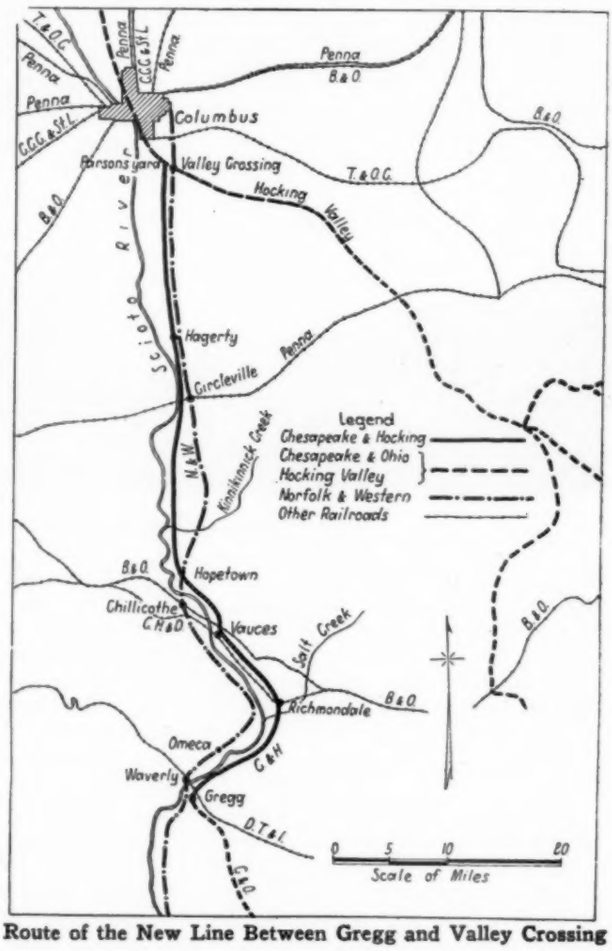
From this overcrossing to a point opposite Chillicothe the country is more broken, the elevation changing as much as 132 ft. in a horizontal distance of 550 ft. However, the following 10 miles is in open country in which the grading is much lighter. In Mile 44 there is a crossing over the Baltimore & Ohio, requiring practically two miles of continuous embankment containing 200,000 cu. yd. of filling, all of which was from borrow.

From Vauces to Salt creek valley, as the result of a paired-track agreement with the Baltimore & Ohio, use is being made of six miles of the Cincinnati, Hamilton & Dayton line. A second track was built at 13-ft. centers from the old line and the old line was rebuilt to standards established for the new one. However, as the country is practically level, little revision of the old grade line was required, except that in the vicinity of Mile Post 52 it was necessary to relocate the C. H. & D. line for a distance of 4,000 ft. in order to permit of a satisfactory junction of the two lines at the south end of the paired track. Here the new line crosses the valley of Salt creek on a one-degree curve, 7,600 ft. long, of which 6,000 ft., is on an embankment from 25 to 30 ft. high, containing one-half million cubic yards of fill. The crossing of Salt creek is effected by a bridge of four 90-ft. deck girder spans on concrete piers and abutments.

From Salt Creek to Gregg

South of Salt creek, the line lies close to the Scioto river for the remaining distance of 11 miles to Gregg, and is supported by side-hill cuts in the shoulder of these bluffs or on embankments across the ravines between them. The grade line on this portion of the location was established at an elevation five feet above high water level of the 1913 flood.

The construction of this part of the line was complicated by the fact that the face of the bluffs was occupied by a highway on substantially the same grade as the railroad, but following the contour of the bluffs, so that the line of the railroad crossed the highway repeatedly. To avoid these crossings, the highway was removed from the location bordering the shoulders of the bluffs to a shelf on the uphill side of the cuts for the railroad roadbed, and since the slopes ran far up the bluff side, this resulted in a pronounced increase in the excavation quantities. Thus, of a total quantity in excavation amounting to 2,310,500 cu. yd. in the 10 miles from Salt creek to Gregg, 1,488,200 cu. yd. was charged to highway relocation. It is only in this territory that any rock was encountered, an over-burden of from 5 to 44 ft. of clay being underlaid with alternating strata



Route of the New Line Between Gregg and Valley Crossing

of rock, clay and slate. The total volume of material classified as rock aggregated 1,080,000 cu. yd.

Effecting the Connection

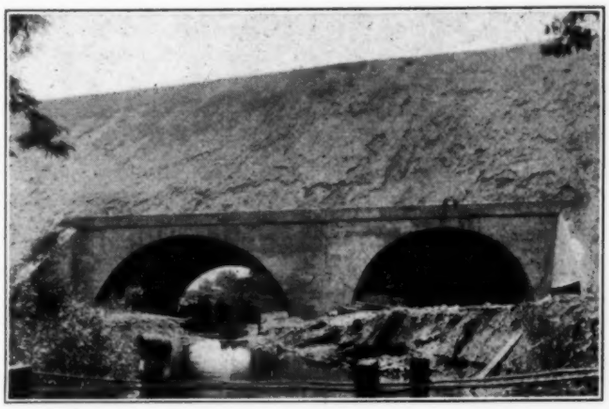
A rather complicated situation was encountered in effecting the connection with the existing line at Gregg, where the Detroit, Toledo & Ironton occupied the location desired for the new line for a distance of about 800 ft. To overcome this, it was necessary to relocate the D. T & I. for a distance of about 2,000 ft. by mov-

ing it further into the hillside, thereby entailing heavy rock excavation. The situation was further complicated by a highway undercrossing of both lines, the crossing under the D. T. & I. being located where the railroad is in a cut 30 ft. deep.

The new line represents a descent from elevation 754.60 at Parsons yard to elevation 595.50 at Gregg. However, adverse ascents result in 138.44 ft. of rise and fall, a large part of which was made necessary by highway and railway grade separations. Of 442 highway crossings encountered on the new line, 41 have been separated, most of them by undercrossings which in some cases necessitated an artificial summit in the grade line of the railroad. In addition to these highway grade separations there are five crossings over other railways. The total curvature in the line is 1088 deg. of central angle, the greatest amount in any one curve being 76 deg. 21½ min. in the one-degree curve at the crossing of Salt creek valley. With exception of four 3-deg. curves and three 1-deg. 30-min. curves, the curves are all of 1 deg. or less. Embankments have a width of 33 ft., while cuts at roadbed level are 41 ft. wide. An allowance of 10 per cent on the sides and tops of embankments was made on trestle fills, while the shrinkage allowance on team work fills was 5 per cent. The tracks are laid 13 ft. center to center with 100-lb. A. R. A. type B rail in 39-ft. lengths. Seventy-five per cent of the ties are treated hardwood and the other 25 per cent are untreated white oak. Three center sidings have been provided each with a capacity of 125 cars. Water stations with treating plants have been established at approximately the third points in the length of the line.

Much Bridge Work Required

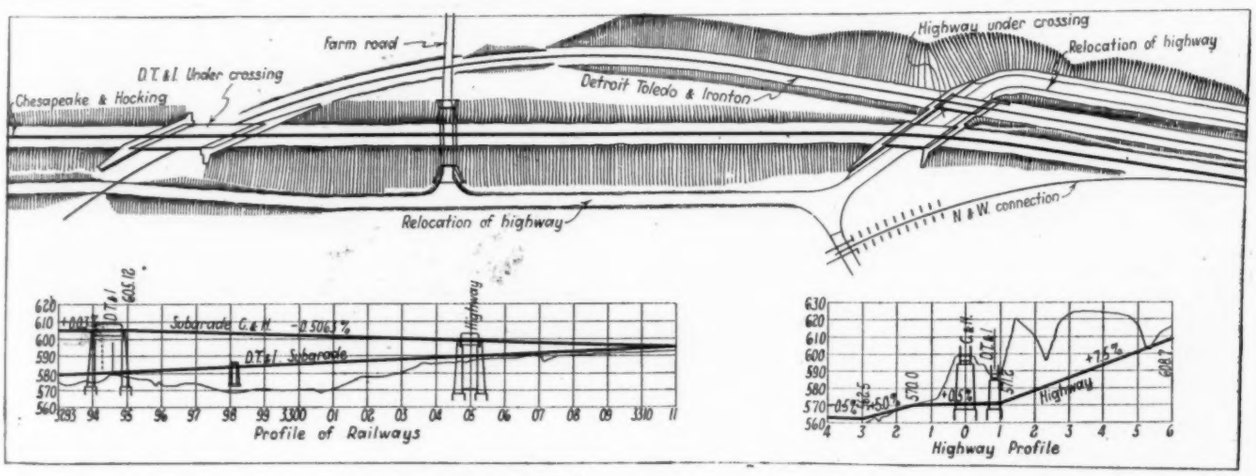
Bridge work represents an important feature of the project. In addition to the structures required for the grade separations, there are a large number of waterway openings ranging from the four 90-ft. spans over Salt creek to 36-in. culvert pipe. All of the larger streams were crossed with deck or through girder spans. There are a number of box culverts and several arch structures, of which the largest has one 24-ft. and one 16-ft. opening. The pipe culverts are of concrete with the exception of a few cast iron pipe lines in locations where the cover was limited. The highway grade separations were effected with a variety of structures, of which the most common for the undercrossings is a longitudinal steel trough design in spans ranging from 24 ft. to 30 ft. clear. The longer spans generally consist of through plate girders with I-beam floors covered with a deck plate, while the crossings of minor highways or private crossings were made with 12-ft. by 14-ft. box culverts. The floors of steel structures are all covered with three-ply membrane waterproofing with mastic protection, Johns-Manville material being used for the north half of the line and Carey waterproofing for the south half.



A Double Arch Culvert

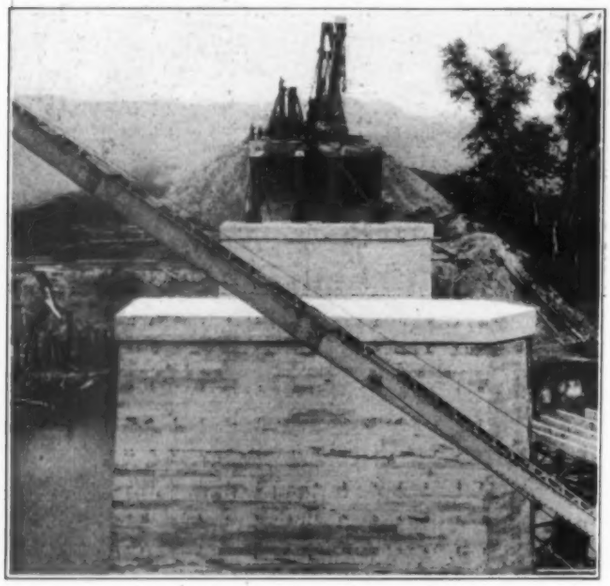
Measures to Insure Rapid Progress

To complete 63 miles of double-track railroad, involving heavy construction, in less than 10 months was no simple task. It involved the thorough fulfillment of two fundamental requirements—adequate supervision and concentration of grading equipment on the job. The first step in meeting these conditions was to divide the line into construction sections of appreciably shorter length than is ordinarily deemed necessary for work of this kind, namely, eight sections ranging from 5.1 to 10.8 miles long. Each of these sections was virtually an independent construction unit, being placed under the direction of the resident engineer with a party of adequate size to insure that the work would be laid out sufficiently in advance of the grading operations to avoid any delays. In addition, the work on each section was awarded to a separate general contractor, with the exception of two adjoining sections, Sections 5 and 6, totaling 10.7 miles long, which were let to one firm, because of the distribution of materials and in order to expedite track laying.



A Complex Grade Separation Layout at Gregg

By these measures and a careful study to insure that the firms employed were possessed of adequate equipment it was possible to start the work simultaneously on virtually the entire line at the outset and after it was well under way to have as many as 70 shovels of various sizes and capacities employed simultaneously, most of them working double shifts. The contractor on Section 8, 10.8 miles long, employed 12 shovels including one 70-ton and two 100-ton machines. As a consequence it



Erecting 90-ft. Girder Spans Over Salt Creek

was possible to obtain the maximum output of 295,000 cu. yd. in one week. Bridge work was also prosecuted actively, and as many as 44 gangs were engaged at one time in placing culvert pipe and building concrete structures.

The Walsh Construction Company of Davenport, Iowa was the contractor for Sections 5 and 6. The other six contractors were the Fritz-Rumer-Cooke Company, Columbus, Ohio; Ferguson & Edmondson Company, Pittsburgh, Pa.; the Sturm & Dillard Company, Columbus, Ohio; Dominion Construction Company, Niles, Mich.; A. Guthrie & Company, Inc., St. Paul, Minn.; and H. W. Nelson Company, Inc., New York. The general contractors handled the bridge masonry and track work as well as the grading.

Grading Methods

The grading was handled with a variety of machines from the smaller types to 100-ton shovels. The haul was divided about equally between standard and narrow-gage equipment. The large number of grade separations resulted in an excess of embankment, such that about 2,000,000 cu. yd. had to be taken from borrow which, when possible, was developed in the cuts, but a number of large side borrow pits were also found necessary. Between Valley Crossing and Circleville and between Hopetown and Richmondale the line is sufficiently close to other railroads to make the problem of hauling in equipment relatively simple. However, on other portions of the line, particularly between Salt creek and Gregg, the contractors were confronted with long hauls over hilly and rough roads. Long hauls were also imposed for the delivery of much of the concrete material.

Material for some of the structures south of Salt Creek was brought across the Scioto river from Omega and dumped in narrow-gage cars for delivery to the mixer plants. At Gregg, concrete for a number of structures was mixed at a central plant and hauled in dump trucks for distances up to 1,000 ft.

Locomotive Cranes Used

Track laying was presecuted progressively from material yards located at points where temporary connections could be made with the Norfolk & Western or the Baltimore & Ohio. Locomotive cranes were used extensively for track laying, both for unloading ties and for setting rails in place.

They were also used to marked advantage for ballasting. By having the cranes on one track lift the opposite track at points about 15 ft. apart for making the first raise, it was possible to make much better progress than with the use of jacks.

The effect of the extra effort to complete the line in minimum time was not only less costly in the end but it resulted in a material saving and provided a much needed transportation link which proved most beneficial and satisfactory to the shippers and the public and prevented a restriction of the movement of coal to the Northwest at a time when the consumers were anxious to get their winter supply delivered.

Careful Planning

Expediting this work was accomplished by careful planning, organizing and scheduling of the various operations; using the most modern and efficient methods and

Highway Under-Crossing on a Sharp Skew

machinery; and displacing hand labor with labor saving machines which worked efficiently both night and day. There was a saving in overhead expenses and interest on the investment due to a shorter period of construction time and a further advantage in getting an earlier benefit of the operating savings obtained by lighter grades and less restriction of movement.

The Chesapeake & Hocking was located and constructed under the direction of William Michael, chief engineer of the Hocking Valley and the Chesapeake & Hocking, with C. A. Whipple, district engineer, in direct charge.

THE "DON'T SWEAR CLUB" has been organized among railroad men at Shawnee, Okla. J. L. Coss, train dispatcher of the Rock Island Lines, is president. Favorable notices have been received from the Little Rock Gazette and from the Rev. William A. Sunday.

View Looking Toward the Hump from the Yard

Car Retarders at Selkirk Yard

New York Central's first installation in service only two months has increased efficiency of operation 50 per cent

By R. B. Elsworth

Assistant Signal Engineer, New York Central, Albany, N. Y.

A CAR retarder installation was placed in service by the General Railway Signal Company for the New York Central on January 16, at the westbound classification yard at Selkirk, N. Y. This location was selected after a thorough consideration of various yards on the New York Central, subsequent to the initial installation at Gibson, Ind., on the Indiana Harbor Belt. Selkirk Yard is located approximately 10 miles southwest of Albany on the new cut-off leading from the A. H. Smith Memorial bridge to the main line of the Mohawk division of the New York Central, west of Schenectady. The yard is at the junction of the freight connections from the Boston & Albany, the Hudson division of the New York Central leading from New York direct, and the River division of the West Shore from the New Jersey side of the New York terminal district.

The westbound yard at Selkirk is made up of a receiving yard of 15 tracks, a classification yard of 25 tracks and an advance yard of 15 tracks. Two leads extend from the receiving yard to the crest of the hump, in order that a second train may be ready as soon as the preceding train has been classified. Approximately 80 per cent of the cars handled over the westward hump are empties, the major portion of the loads being detoured around the hump for classification at other points. At the present time approximately 1,700 to 1,800 cars are being classified on the hump daily.

Prior to the installation of car retarders, car riders were used and the switches were operated by General Railway Signal Company electric switch movements controlled from a desk lever machine on the second floor of the yardmaster's office at the crest of the hump. This system had been operating satisfactorily since the yard was constructed, approximately four years ago.

The transfer of the control of the switches from the yardmaster's office to the new towers was made one week before the car retarders were placed in operation in order that operators might become familiar with the new arrangement of the switch controls before being required to operate the retarders. The change from the car riders to the car retarders was made at 8 a. m., January 16.

Retarders Permit Two-Trick Operation

The car retarder installation demonstrated its efficiency on the first day, and at the end of three weeks, operation was placed on a two instead of three-trick basis. By operating the yard on a two-trick basis, 8 a. m. to 4 p. m. and 8 p. m. to 4 a. m., there is no material delay in car movements through the terminal and time is provided between tricks for locomotives to go to and from the roundhouse, thereby reducing the number of locomotives necessary for operating the hump.

The capacity of the yard has been increased 50 per cent by the installation of retarders, which will permit additional savings with any increase in business. Although the operators are not yet thoroughly proficient in the operation of the installation, more than 900 cars are often classified in over 600 cuts during an eight-hour trick.

When a train arrives in the receiving yard, the conductor transmits to the yardmaster's office a summary of his running slips, showing the consist of the train. This list is teletyped to the three operating towers from a master typewriter in the yardmaster's office, so that when a train starts up the hump to be classified, the yardmaster, the operator at each tower, and the yard conductor at the top of the hump, know the entire consist of the train, including the number of cuts, the car numbers, the approximate weight of each car, and the track on which it is to be classified. The weight of the car indicates in a general way the amount of retardation which will have to be applied.

The hump grades required at this location are of particular interest. The natural slope of the ground is ascending for westward movements, making it necessary that the crest of the hump be on a fill 45 ft. above

natural ground surface. The difference in elevation between the top of the hump and the first switch at the bottom, is about 14 ft., the grade between these two points varying from 6.2 per cent at the top to 1.5 per cent at the bottom. The 1.5 per cent grade continues through the retarders after which it changes to 0.5 per cent and finally to 0.3 per cent on the classification tracks.

The prevailing winds are from the west and southwest and are frequently very strong, imposing a considerable resistance to car movements, due to the exposed location of the hump. While the grades must be steep enough to handle empty cars under the winter conditions with an unfavorable wind, sufficient retardation must be provided for a 70-ton car moving under the most favorable conditions. The grade of the classification yard has been made 0.3 per cent, but it is possible that, in order to get satisfactory movements with the empties, it may be necessary to increase this to 0.35 per cent.

The determination of the track and switch layout was influenced by the desirability of making use of as much of the arrangement already in service as was consistent with the requirements of the new layout. Sufficient distance was allowed between a switch and a retarder for the locking-up track circuit. Space was provided for switches leading to six additional tracks on the north side and two additional tracks on the south side of the yard. It was also decided not to use lap switches or any switches shorter than No. 8.

With the type of retarder employed it is not practicable to use a standard rail joint within the limits of retarder, and such joints are welded. In order to keep the number of welded joints to a minimum and effect the greatest economy of space with proper track circuit locking, a detail plan was prepared specifying the exact length of each rail in the vicinity of the switches and the location of each rail joint. This plan was of material assistance in providing correct material and making a quick and economical installation.

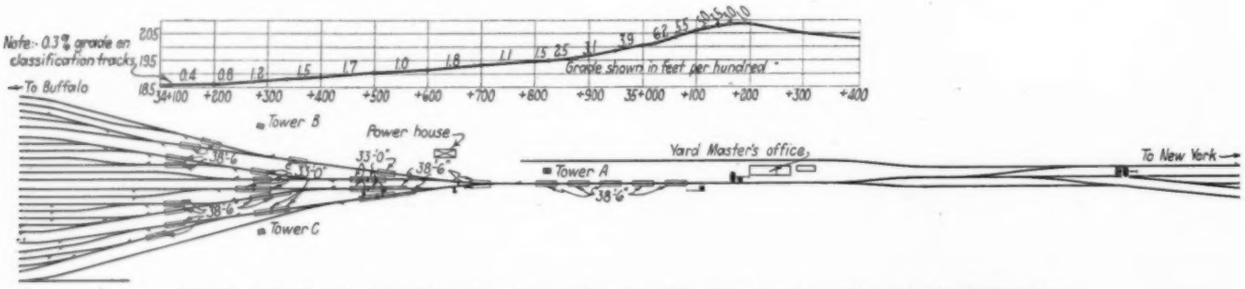
There are sufficient retarders on the south side of the yard for handling 70-ton loaded cars on any track. The north side is equipped for retarding empty cars only. In several cases it was possible to install a retarder on the lead of a turnout so that a one-rail retarder could be used. Where these are used, a guard rail is placed parallel with and along the opposite rail to avoid the derailment of a car which may have been lifted by the retarder.

Retarders Controlled from Three Towers

The installation is electrically operated and controlled from three towers; Tower A, located about half way up the hump and Towers B and C at the foot of the hump on either side of the yard. The towers are 8 ft. 6 in. by 10 ft. 6 in., built on a steel frame; the floor of Tower A is 13 ft. 6 in. above the rail and the floor of Towers B and C, 20 ft. above the rail. Iron stairways are provided around back of the buildings and plate glass windows at each end and on the track side. Heat is provided by electric heaters. The towers are of fire resisting construction.

The face of each tower control machine is set at an angle of approximately 30 deg. from horizontal and has three rows of levers, the top row for the control of the skates, the center row for the five positions of the retarders, and the bottom row for the switches. Spare spaces are provided in the control machines for additional switches, retarders or skates which may be required.

There are 33 car retarder units, 14 of which are double retarders 38 ft. 6 in. in length, 14 double retarders 33 ft. in length, and 5 single retarders 38 ft. 6 in. in length. The double retarders are installed on both rails of the track and the single retarders along one rail only. Contactors for the retarder operating apparatus are mounted in a sheet iron box supported by two concrete posts adjacent to each retarder. The five double retarders on the hump proper, two single retarders, and the three junction switches, are controlled from Tower A, the remainder of the switches and retarders are divided along the center line of the classification yard, between Towers B and C.


Note:- 0.3% grade on classification tracks
205
195
185
To Buffalo
0.4 0.8 1.2 1.5 1.7 1.0 1.8 1.1 1.5 2.5 3.1 3.9 6.2 5.5 4.5 5.0 5.0
Grade shown in feet per hundred
34+100 +200 +300 +400 +500 +600 +700 +800 +900 35+000 +100 +200 +300 +400
Tower B
Power house
33'-0"
38'-6"
Yard Master's office
Tower A
To New York
Tower C

Track and Signal Plan Showing Track Layout, Grades and Location of the Retarders

Motor-operated track skates, for the purpose of stopping a car which may not have been properly retarded, are provided on the 12 tracks on the south side of the yard intended for loaded cars.

The retarder apparatus is of the latest improved General Railway Signal Company design similar to that installed at Mechanicville, N. Y., on the Boston & Maine as described in the *Railway Age* of February 4, page 295. The retarders themselves are rugged and so designed that in case a car is lifted due to excessive retardation, the flange will be held until the car may drop back on the rail.

Flood lights for car rider operation which had been in service on steel towers, throwing light parallel to tracks, were transferred to the roof of operating towers to afford maximum illumination for operators in observing car numbers and speeds.

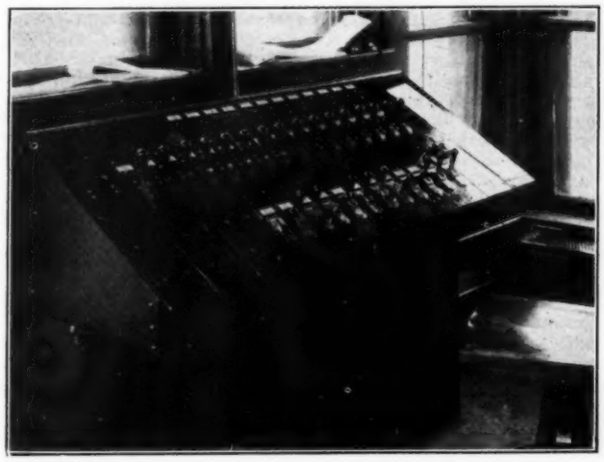
A two-arm color-light signal is located at the crest of the hump for controlling the engine which is pushing cars over the hump. Three indications are given with the top light: green, "Normal Speed;" yellow, "Slow Speed," red, "Stop." Yellow on the lower light indicates "Back Up." Repeater signals are located at the throat of the receiving yard 1,600 ft. in the rear of the hump. A signal facing the classification yard indicates yellow when the movement of the trimmer engine toward the hump is desired.

A loud speaking telephone installation provides telephone service in each of the towers and on the ground at the crest of the hump. The telephone installation was made in duplicate throughout, to provide for emergency operation in case of a failure of one set. The teletype system installed for printing car lists is also in duplicate, with machines in each of the operating towers controlled from the yardmaster's office.

Locking Prevents Switch Operation under Car

Track circuits, beginning 25 ft. in the rear of each switch point and extending 8 ft. beyond heel of the point, are provided for preventing the operation of a switch beneath a car or engine. A repeater, adjacent to the machine lever in the tower, indicates when the track circuit is occupied. Due to the desirability of making these locking circuits as short as possible, both to keep down overall length of switch layout and to permit minimum safe headway between cars, the distance between the insulated rail joint and the switch was limited to 25 ft. Under such conditions a normal track circuit will not shunt quickly enough to prevent throwing a switch beneath a fast moving car. After extensive investigation a reliable circuit was developed, such that a car wheel passing over the insulated joint at end of the circuit, causes the practically instantaneous pickup of the relay and prevents the starting of switch operation until all the wheels have passed off the circuit.

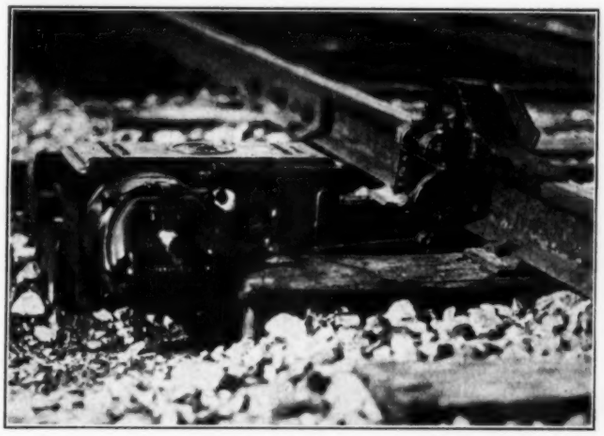
The track switches are operated in slightly less than one second by G-R-S Model-6 switch machines. By changing to a faster motor, this time may be reduced approximately one-half, in case operating conditions make this desirable. The quicker acting switch, due to the greater strain on the parts, requires more care and an earlier renewal than is the case with standard machines.



Control Machine in One of the Towers

The retarders are operated normally by 250-volt direct current supplied from a 30-kw. General Electric motor generator set. The generator sets are in duplicate, only one set being operated at a time. Each set will withstand an instantaneous demand of approximately 300 amp. which will care for the operation of the maximum number of car retarders required at one time. The motors of the motor generator sets are operated by 440-volt, 3-phase, 60-cycle alternating current, stepped down from the 6,600-volt local yard power line. A 110/125-volt storage battery supplies power for the operation of the switch machines.

Under normal operating conditions the car retarder and switch operating circuits are completely separated. In case of a power failure or the stopping of a generator, control switches will automatically connect the two 100-cell sets of storage batteries in series and then make the connection to the car retarder feeders, thereby insuring continuous current supply. This arrangement of power supply is desirable in carrying out car movements which may be under way at the time of a power failure. The storage battery will operate the switches and retarders for several hours. When, after a failure, power is restored, the automatic control restores the plant to its normal operating condition, cutting out the storage battery and starting the generator.



An Electrically Operated Skate Machine

The assembled switchboard is 10 ft. long, 6 ft. high and in accord with the A. R. A., Signal Section switchboard standards. The operating batteries arranged in duplicate sets are charged by a 40-amp. mercury arc rectifier, the maintainers being instructed to alternate the switch operating load between the two sets of battery so that all cells will be kept in good condition, and nearly charged at all times. The 100 cells of storage batteries are the nickel-iron-alkaline type of 300 a.h. capacity as manufactured by Thomas A. Edison, Inc.

The car retarder installation, complete with power supply, was made by the General Railway Signal Company in accord with plans and specifications of the New York Central.

* * *

On the Maine Central Between Portland and Bangor

Cost Accounting Not Applicable to Railroads

Plan proposed by National Industrial Traffic League analyzed by J. E. Slater

RAILROAD operations are so widespread and so huge that any real cost accounting system as applied to them is practically impossible, J. E. Slater, secretary and treasurer of the American Brown Boveri Electric Corporation, and formerly special assistant to the general manager of the New York, New Haven & Hartford, testified on March 23 at the hearing before Commissioner Eastman and A. M. Bunten, chief of the depreciation section of the Interstate Commerce Commission, on the proposed revision of the railway accounting classifications.

This condition reduces the railroad managements, Mr. Slater said, to the necessity of making special studies of all kinds, not only for use in rate cases but in checking costs for administrative purposes. He expressed the opinion that railroads might well make more such special studies but that more benefit could be derived from them than from attempts to maintain the compilation of a large amount of data which would be useful only in a relatively small number of cases.

Mr. Slater testified at the invitation of the commission upon the suggestion of the National Industrial Traffic League and his statement included an analysis of the alternative plan for a revision of the accounting classifications, embodying the idea of cost accounting, submitted in behalf of the league by J. W. Roberts, president of the Roberts-Pettijohn-Wood Corporation at the hearings in November.* He expressed the opinion that the plan would provide little if any information which would be particularly useful for operating officers for administrative purposes which is not or cannot be made available from the standpoint of the present accounting plan, and that arbitrary bases of apportionment are not sufficiently accurate to make the statistics useful for checking purposes. He also said that the plan would not serve any useful purpose in connection with the handling of a budget and that it would call for the compilation of a large amount of data regularly which would be useful only relatively occasionally.

Mr. Stater's experience in connection with railroad studies, analyses and statistics covers a period of approximately a year with the Union Pacific and ten years with the New York, New Haven & Hartford, including a year as statistician for a committee organized to develop cost and operating features in connection with electric operation; about two years as statistician in the office of the auditor of disbursements, and a year as special accountant; a year as chief clerk to the general manager and the balance of the time as special assistant to the general manager, the chief function of his work in that connection being the handling of operating statistics from the analytical standpoint, the handling of the operating budget and the compilation of numerous cost studies in connection with rate cases and division cases. After leaving the New Haven he was for a year at the University of Illinois as professor of transportation and since that time he has been with the American Brown Boveri Electric Corporation as assistant to the president and as secretary and treasurer.

WASHINGTON, D. C.

An abstract of his statement, including some of his replies to be questions by Commissioner Eastman and others follows:

Roberts Plan Analyzed

In the first place, it is my understanding that the plan calls for a division of all operating expenses as between those expenses which are termed station expenses, those which are termed train terminal expenses and those known as line haul expenses; that station expense involves all expenses incident to either the collection and original dispatchment of the freight and the collection and final turning over of that freight to the consignee; that such expenses necessarily involve not only the expenses in the operation of the station itself but also the expenses incident to the switching of the car from the station into a train or from the train to the station, that, therefore, what is known as train terminal expenses represents what in railroad parlance is usually called intermediate terminal expense, in other words, the breaking up of cars of one train and the classification of them and placing into another.

It is my understanding that the second fundamental feature of the plan involves the division of the expenses when obtained by primary accounts specified into certain service costs, those services being one for all freight train service and eight for passenger service—suburban, coach, sleeping car, dining and buffet car, baggage, mail and passenger trains, express and passenger cars, and milk in passenger trains—and that the third fundamental feature is involved in the division of maintenance expenses into a considerable number of items, the principal purpose of which is to measure the maintenance taken out and the maintenance put into the physical property. There are many other features, but those are the ones which primarily, particularly the first two, will be considered in my direct testimony.

After giving serious consideration I have come to the conclusion that the alternative plan for statistical and administrative purposes would provide little, if any, information which would be particularly useful for the operating officers. I mean by that in the administration of the property, in the elimination of wastes, in the effecting of economies.

Arbitrary Apportionments Not Useful

The use of the division of expenses between terminal and station and line haul provides little assistance to what is required, with the exception of the analysis of the expenses of train and engine crews in local freight train service. Other train expenses which are common to station, yard and train cannot be accurately measured. It is possible to divide the expense of train and engine crews between the time and the consequent expense incident to station, switching, and switching cars into trains and out of trains when those cars are destined to that point or originating at that point. The analysis of the crews' time would show that amount of expense and could also be made to show the expense incident to switching cars into and out of the train at train terminals because many through trains stop at one or two points en route to switch out a certain number of cars out of that train and switch other cars into it.

When, however, we come to the determination of other train expenses, such as fuel, water, lubricants, engine house expenses, train supply expenses, we have now no basis for determining how much of the expense is properly ascertainable to the three bases, nor does the plan suggest any basis, except possibly a purely arbitrary one, under which the fuel, for example, or power, would be divided between the three elements specified. In fact, the general criticism which I would make of the alternative plan in this respect is that arbitrary bases of apportionment are not sufficiently accurate to make the statistics useful for checking purposes.

* See *Railway Age* of November 12, 1927, page 943; November 19, page 984 and December 17, page 1223.

I am trying in no case to criticize any detail bases of apportionment but to point out that, at least in my opinion, any basis of apportionment would necessarily be arbitrary, and that an arbitrary basis of apportionment is not going to be of any particular help to a general manager or a general superintendent or an operating vice-president in checking the amount of fuel consumed for a train or a group of trains between station, train terminal and line haul.

From the standpoint of cost finding arbitrary bases of apportionment are necessary, simply because direct assignments in most cases is impossible, but I am confining this part of my testimony to that feature in which Mr. Roberts states that in his opinion this method, this alternative plan, is helpful for purely administrative purposes, leaving out the question of revenues and expenses of individual classes of traffic, and it is that thought I am concerning myself with now.

The maintenance officer is not interested in where the maintenance expense goes. I mean by that, if we consider, for example, the maintenance of roadway buildings, the maintenance of power plants, the maintenance of fuel stations, which are considered, as I understand, common accounts, and are then divided among the various elements of service in connection with the use of fuel or power, or whatever it may be, the maintenance officer is going to be hindered rather than helped if certain of the expenses for which he is primarily responsible are combined with those expenses for which he is not responsible.

For administrative purposes we are interested in all of the maintenance whatever it may be, providing that officer or that department is responsible for the amount of that maintenance. The thing is particularly true in connection with fuel or with power.

Budgeting

I have had a considerable amount of experience in the handling of budgets on railroads and also in one industrial plant and, of course, the fundamental purpose of a budget is to charge and include in the budget of each individual or department those expenditures for which that department is responsible, regardless of where the charges ultimately rest. For example, under maintenance of way we must have all expenses and only those expenses for which the maintenance of way department is responsible. In connection with mechanical expenses we found that the present series of accounts was embarrassing to us in one respect in that the mechanical department is responsible not only for the maintenance of locomotives, cars and other equipment, but it is also responsible for the operation of engine houses, and, therefore, we had to separate from the budget for the transportation department those expenses which involved the operation of engine houses and charge that to the mechanical department.

Likewise, as to the transportation expense, the transportation department must have in its budget only those expenses and all of those expenses for which it is itself primarily responsible. It means that the budget requirement is a separation into departmental functions and not operating functions.

Its second requirement is that there should be a breakdown into a large number of geographic divisions rather than of operating functional divisions.

For example, if the budget is to be carried to its logical conclusion we must have the budget for individual yardmasters, for individual station agents, for individual superintendents, for individual repair points and for individual trains or classes or groups of trains, and it makes little difference whether those trains or those stations or yards or what not are interested in a number of operating functions, our primary purpose is to make certain that the expense in the budget is measured with the individual and all of his activities, whatever they may be.

On that account, in my opinion, the plan proposed would not serve any useful purpose in connection with the handling of a budget, particularly in its use of the clearing and common accounts.

Cost Studies

When we turn to the use of the plan for cost studies a somewhat different method of approach is necessary. We do find, for example, that in any cost study which involves the complete movement of traffic from origin to destination and involving station, train, terminal and line haul, certain accounts must be divided on some basis or other among those three important and well-defined classes.

On the other hand, we find that such subdivision is not necessary for all accounts, nor is it necessary for all studies. To be specific, it is difficult for me to see on what basis the roadway accounts can be divided between station terminal accounts and train terminal accounts. They should be divided and necessarily would have to be divided in any elaborate study as between terminal maintenance and road maintenance and, as a matter of fact, of course, the present accounts provide for some such division, but in arriving at a basis to divide roadway maintenance as between station terminals and train terminals I cannot see anything but the most arbitrary basis possible, with little of value gained.

The difficulty there lies in that the same tracks in many cases, the same facilities, the same locomotives, the same initial switching of cars would involve tracks, facilities, equipment and crews which were performing station terminal service and those which were performing train terminal services. There will be certain tracks, of course, which either 100 per cent or substantially 100 per cent use would be for station terminal expense, but practically all of the train terminal tracks would be used incidental to station terminal operation as well as train terminal operation.

Furthermore, in arriving at a cost study I never find that it has been fundamentally necessary to provide such a subdivision which necessarily would be made on arbitrary grounds or on an arbitrary basis; that the same results could be obtained by a mere subdivision as between terminal expense, including both station and train terminal, and line haul expense.

Other accounts which would provide the same difficulty are for signals and crossings. A switching tower at the head of a yard is used for both purposes. The same difficulty is found in connection with the subdivision of locomotive and car repairs, not as between train and yard, but as between the two kinds of terminal expense.

There are also a good many studies which have been made and which I have personally made in which the alternate plan would be necessary. For example, any terminal studies would have to go into so much more detail than the proposed plan that you would have to make about the same kind of a special study as would be made under the present scheme of accounts. The alternative plan does not provide very much in addition and certainly does not provide the full amount of detail necessary.

The same is true, for example, with a group of studies—for example, the New York Harbor study—which would again call for a special study under any plan. The same is true in connection with commutation cases because it can be very quickly shown that the allocation of expenses to the service known as suburban does not provide the full detail necessary for an accurate study of commutation traffic.

The plan suggested would have been helpful to me in connection with any studies I have made only in connection with the so-called mail cases and the case decided by the commission some year and a half or two years ago which involved the movement of milk on passenger trains in New England.

Now, it should be pointed out that the commutation terminal studies, harbor studies, or any study which involves the movement within a restricted area, have certain important differences as compared with studies such as the mail and the milk cases. In the first place, the latter cases indicate what might be termed the universality of the service on the railway systems; in other words, mail and milk move over the entire system. Some arbitrary bases of apportionment can be used since practically all divisions, most of the stations, most of the yards and most of the trains are affected by or are handling a certain amount of the traffic under review. In other words, the mail and milk traffic was so spread over the entire system that relatively arbitrary bases of apportionment could be used.

On the other hand, the studies covering a restricted area necessarily must involve a much more detailed analysis and cannot be based upon an apportionment of the total expense into the various classes of traffic.

Another point I would like to make is: The study as developed thus far provides little more breakdown for freight train service than the present subdivision of expenses between passenger and freight. Of course, it does provide for the station, train terminal and line haul expense which is useful in connection with certain of the accounts but with relatively few of the accounts. The breakdown of passenger service would be helpful because it follows in a considerable degree the bases which have been used by the Post Office Department and by the railroads and in certain cases approved by the commission's decisions. The alternative plan would be helpful in connection with those cases, but in connection with other passenger train studies, as in the case of commutation, it would not be helpful.

When we turn to freight service where there is no further subdivision, I am assuming, as Mr. Roberts has pointed out throughout, that, this being merely a suggestion, a first step, if this alternative plan was to provide the help to the railroad officers, to the commission and to the general public, a necessary second step would be a further subdivision of the freight train traffic into the various elements of freight service. This

has been done in connection with station expenses in proposed allocation of certain expenses to traffic involving the products of mines, products of forests, products of agriculture, and so on. Now, the further one goes into the division of the services in order to obtain the costs of those services the greater difficulties are found, and by difficulties I am referring not so much to the question of the expense involved in making such apportionment but the difficulty in arriving at such apportionments which will be considered fair.

Advantages of Special Studies

The advantages of a general cost ascertainment, in my opinion, are three. In the first place, since bases of apportionment have been worked out and either accepted or established through commission order, it would eliminate a considerable amount of argument and discussion as to whether the proper expense to be assigned to a particular service is established on a proper basis or not.

In the second place, it would provide a complete subdivision of the expenses among all of the services contemplated, so that there would be less likelihood of one class of service which is under review being either overloaded with expense or underloaded, in accordance with the prejudice of the particular people who are putting up a special study; and it has been said that such a general cost ascertainment would avoid post mortem compilations.

The advantages of special studies may also be divided into three parts: First, they provide greater flexibility in that the scope of the study is more easily defined; secondly, they make possible a greater amount of detail for the study of a specific kind of traffic than would be possible under a general cost ascertainment; third, the use of what I shall call the method of integration of expenses as opposed to a method of apportionment provides a more accurate ascertainment of costs.

At this point it should be stated that the alternative plan suggested does not preclude the use of the so-called method of integration, nor does it preclude the use of a much larger amount of detail than would be used in the general ascertainment plan. But the alternative plan does not remove, in my opinion, the necessity for the same kind of special studies as are required under the present system of accounts.

The Method of Integration

In my opinion, the best basis for determining costs is the use of a method which builds up the costs from a large amount of supporting data rather than the use of a method of ascertainment in breaking down a total through some bases of apportionment, which are more or less arbitrary, into the various elements of service. For example, suppose we wish to ascertain the cost of a certain service which is restricted, we will say, between two points and is not scattered over an entire system. For example, let us say it may be a commutation case where the traffic is restricted. Under the method of integration we would subdivide all of the accounts by geographical subdivisions, maintenance of way expense by sections or by distance, mechanical expense by classes of locomotives, or classes of service in which they are provided, and where those locomotives are used, the transportation expense into groups of trains, into individual yards, into individual stations. That will be the first performance.

Second, the subdivision of the traffic in accordance with where that traffic moves. So if you are going to take into account only the expenses which apply in the territory which is under discussion, and then the application of those small groups of expenses, geographical units, in the final total it would be the cost of that particular service within that territory.

As distinguished from that, what I call a method of apportionment is where the total expenses for the railroad, or possibly the total division expenses for a subdivision of the railroad, if that were determined, would be assigned to this particular class of service within that territory upon the basis of gross ton-miles, car-miles, locomotive-miles, or whatever the basis of apportionment may be, for the service under review as compared with the total locomotive- or car-miles, and so forth, for that particular district or particular railroad.

The so-called method of integration—upon which I do not want to lay too much stress—would not be assisted in the alternative plan. If such a cost study were to be made, practically the same bases, the same amount of detail, would have to be compiled as under the present accounting plan. In other words, the alternative plan provides help for that only to the extent that it provides automatically for the division of certain of the accounts, which in any cost study would have to be divided; for example, the division of train expenses between yard and between terminal and line expense. The alternative plan would also be helpful in connection with some such case as the mail pay case, where a somewhat similar plan has already been placed before the commission.

The advantage of the general apportionment is clear when the volume of traffic and when the kind of traffic being analyzed is so large as to apply to substantially all parts of the system or the territory, all trains and all stations, or to a substantial part of them. To the extent that there is a more detailed breakdown of the traffic, to the extent that the traffic represents a relatively small amount of the total, to the extent that the traffic is confined more or less to a territory, to the extent the traffic is confined to a certain extent to relatively few functions, to that extent I think that this general cost ascertainment plan or any general cost ascertainment plan would not provide an accurate result.

We have found ourselves, in studies which have been made under which we have taken total expenses and divided those into various elements upon the basis of certain predetermined bases of apportionment, as gross ton-miles, or car-miles, or locomotive-miles, or car-days, to the extent that that traffic is general to the road or to the territory under review, to that extent some general plan of apportionment will work out reasonably well. But to the extent that it applies specifically to a relatively small territory or to a relatively small group of trains or to certain terminals, to that extent the only method, in my opinion, which is worth anything in arriving at even an approximate cost is the method that I have termed for the basis of discussion "the method of integration."

The disadvantage of the use of the alternative plan for methods of cost finding is that it would call for a compilation of a large amount of data which would be useful only in a relatively small number of cases or a relatively few times during the year.

The factors of speed gross ton-miles or allotted car space in terminals, or car-foot-miles, or terminal or station car-days, would be of relatively little use except in some kind of a general cost ascertainment. And as one who has been interested in attempting to analyze railroad costs, I think that the general result of that amount of money for detailed analysis of operations would be more helpful than for a compilation of figures of this kind.

Let me be specific on that point. I have made some study of mechanical maintenance costs, locomotives and cars, and it has been my opinion that a considerable amount could be done in the way of further analysis of costs in locomotive back shops, in the big car shops, or even in some of the smaller car shops. I believe that more can be done in the way of analysis of engine house expenses. I believe that more can be done in the way of working this analysis into certain standard costs, which can be used for budget purposes. Now, the expense involved in compiling figures which would be used only occasionally, such as these that I have mentioned, would be considerable. I believe that the general advantage, certainly from the railroads' standpoint, and possibly in the long run from the standpoint of the public, necessarily would be better served in the use of additional expenditures for the production of a greater amount of detail in connection with such operations than it would be in the compilation of figures which could be used only for general cost purposes. In other words, the railroad operations are so widespread, so huge, that any real cost accounting system is practically impossible. On the other hand, that would apply not only from the standpoint of rate cases but would apply also from the standpoint of providing the railroad management with the same kind of detail as is available for the average industrial executive.

That reduces the railroad management to the necessity, in my opinion, of making special studies of all kinds, not only for rate purposes, for cost purposes, but also for the determination of efficiency, for the working out of standard costs. And the work which was done on the New Haven Railroad during the period when I was there, and which is being maintained, I know helped enormously in that respect in assisting the management in reducing expenses and getting them fully under control.

True Cost Accounting Not Applicable to Railroad Operations

At this time I think it is also well to state that this plan or any plan is not a cost accounting plan, in my opinion, speaking from the large cost accounting sense. That can be made clear in a specific instance. It so happens that the company with which I am associated manufactures turbines for central power stations, motors for electric locomotives, and so forth. It also, by chance, has always been engaged, or at least, for 30 years, in the quite different industry of constructing ships. One is the construction process; the other is a manufacturing process. One is a process which involves the turning out of a considerable number of units according to a specified design while the other involves the turning out of individual units in ac-

cordance with individual design. Yet, different as those are, both of them can lend themselves to definite cost accounting. If, for example, we start to construct a ship it is possible concurrently to keep track of the largest portion of the expenses for labor and for material, and even through close analysis of overhead to charge with a reasonable degree of accuracy the overhead charges applicable to the construction, first, to the drawing of the plans, secondly, to the purchasing of the material, to the making of patterns, to the making of templets, and to the erection of the hull, to the machining and assembling of the machinery for the propulsion of the ship, for the assembly of that machinery into the ship, for the completion of that ship in its interior construction, its painting, and so forth, to the trial trips of the ship, and to its ultimate delivery. This specific cost of the labor for the particular department under review, the expenditures for the material for the particular parts under review, can be accurately ascertained not only for that particular contract for that ship but for a large number of the segregations of the parts of that ship.

Likewise, in constructing or in manufacturing motors it is possible to get separately and accurately the specific costs of stamping out the metal, the cost of the assembly of laminations, mica, copper, into the various parts of the locomotive, such as commutator, such as the rotor or the stator, the costs of winding the coils and the cost of assembling those into the final product. Those are not apportioned costs. Those are specific labor items which are compiled concurrently as the work goes on and which makes it possible for the management to know what the expenses of the individual parts are, not only when the item is applied but also at any stage during that application.

Let us compare that with a like cost accounting in the movement of a specific class of traffic from point of origin to point of destination. Let us assume, in order to avoid too many complications, that we are concerned with carload traffic rather than less carload traffic. Let us assume that we are interested in the movement of carloads of a certain class of traffic that moves from relatively few points of origin to relatively few points of destination. It is possible, of course, to determine with a fair degree of accuracy the costs of handling that car, so far as the crew expense is concerned, from the station platform or siding or private siding into some assembly yard. Once that would represent a direct labor cost which can be compared fairly with the direct labor cost in the early stage of construction of a piece of equipment.

Immediately, however, complications arise in the fact that the locomotive which handles the car burns fuel or power, and there is no practical basis of determining the exact amount of fuel or power for the handling of that particular car. Let us assume, however, for the purpose of simplification, that the car was handled by an electric locomotive, that the electric locomotive was metered so that the exact amount of power for a particular switch for a particular car from the private siding to the assembly yard was possible. Once, however, that car reaches the assembly yard all direct cost ascertainments vanish. The car is handled with other cars with other classes of traffic while it is being classified. It is probably handled by a locomotive which not only does that class of service but other kinds of terminal service, that the switching is performed on tracks which are used not only for the handling of cars to and from that particular point of origin and destination but also cars which are being handled there as an intermediate terminal. The car is placed in train which includes cars of many other classes of traffic, and where the expenses of the train crew cannot by any process of imagination be directly assigned to the particular car under discussion. The same is true with respect to the locomotive handling the train, with the tracks over which the train runs, with respect to the terminal through which the train runs and may be broken up and reclassified and on to the point of destination. At the point of destination it is possible, we will assume, to get the cost of placing that car to its ultimate private siding. But only the first step and the last step are in any sense comparable, in my opinion, to the cost accounting methods which are found in the usual cost accounting plan.

I think I should qualify that to the extent that my cost accounting experience is limited to one company. It is possible there may be something more comparable to the difficulties in others, but I must necessarily base my testimony upon my own experience. Therefore I think it is clearly understood that this or any plan would not provide a true cost accounting basis but only what might be called a general cost ascertainment basis, knowing that the bases to be used in arriving at the expenses to be assigned to a particular class of traffic are necessarily arbitrary.

On this account it has seemed to me that for general purposes and for regular purposes special cost studies are likely to provide a more accurate basis and that it is not necessary to arrive at a general ascertainment plan before attempting to use such special study. It is my belief that special studies can be properly supervised so that the public is furnished with sufficient data to check the studies.

Q. (By Commissioner Eastman). Mr. Slater, has your experience led you to believe, whether costs are ascertained through a general accounting system or through special cost studies, that some form of ascertainment of costs of railroad operations for services is desirable to a greater extent than has been customary in the past?

Approximate Costs Desirable

A. I would say that my experience has led me to believe that approximate costs, both sides, including the commission, realizing that they are necessarily approximate, of many lines of traffic can be ascertained, and in most cases it is desirable that they should be ascertained for the benefit of all concerned.

Costs in a general sense are extremely useful. We have made studies on the New Haven in connection with the application of the budget principle which would seem to be rather difficult to apply to a railroad, where the various fluctuations or traffic made it difficult to establish a definite figure as to the cost of performing certain operations on a certain division. Nevertheless, we made studies to find out to what extent there were fluctuations in yard expenses, in train expenses, in station expenses and in other expenses, and those studies over a period of time indicated there was a certain group of expenses which we could declare fixed. They were not absolutely fixed, but they were so close to that that we could determine them as fixed expenses. We found over a period of time that was the best performance in the way of station costs, yard costs, train costs, fuel utilization, and so forth, and for the budget used those special studies in establishing what should be the basis upon which the budget was to be effected. And that gave us the advantage of giving the operating officers on the divisions a mark to shoot at which represented an actual performance, either in station, yard, trains, or any other class of work, and as to which there had been no combination of this best performance in any one period. So while they were struggling to meet a standard which had been met before in the case of the individual performances, in connection with this budget it was based upon the sum total of those best performances, and they were actually struggling to meet something that they had never done before. Nevertheless, we very quickly found that they were able to meet that combination of best performances, and the results in connection with station, yard and train performances on the New Haven in the last three or four years speaks for itself in that connection.

Cost of Motor Bus Operation

Q. Did you ever have occasion to make special studies for the purpose of determining whether in certain cases motor bus operation on the highways should be substituted for train operation?

A. Yes, sir, we did. Those studies were made just prior to the time the New Haven went into the organization of the New England Transportation Company. We made studies of the actual train operating expenses for the individual branch and individual local trains on certain territories. There again it was a method of integration, so to speak, in getting the exact expenses of individual trains. Where we could not get the exact expenses, as, for instance, in the case of fuel, we were able to get the fuel costs for classes of locomotives in the same kind of service, and we found that there were certain costs in connection with the various branches and sections of main line, that those costs, strange enough, in all the territories more or less came around to a figure of $1.25 per train-mile. We had certain information, of course, as to bus costs, and we figured if we figured 30 cents a mile, or thereabouts, it would be a reasonable figure, covering all of the bus operations. There was no answer to those figures. The result was that regardless of whether the busses themselves showed an operating profit they were of substantial advantage in reducing the train operating expense itself.

Q. In the field of freight rates are cost studies useful, in your opinion, not only from the standpoint of regulation by this commission, but also from the standpoint of the traffic manager in determining what rates he may safely accord various classes of traffic?

A. Well, some of them have told me no; and we have made some studies only to find that they were, in their opinion, useless.

Speaking for myself, it seems to me that it is more or less self-evident that if there is some doubt as to whether a rate is high enough on a certain class of traffic, some kind of a stab should be made, at least, to find out what that cost is. Of course, the difficulty there applies to a special study as well as it does to a general plan, that the further down you go into the detail of the kind of traffic, the greater the difficulties are

and the more you must qualify the accuracy of the result.

Q. Now, we have before us the question of the revision of our present classification of accounts for steam railroads. Have you any suggestions to offer as to what revision, if any, should be made?

Special Studies Necessary Under Any Plan

A. Unfortunately, I have not had the opportunity to work on the constructive side of this as much as I would like. Speaking from my own experience, I have not found that the present method of accounts prevents in any sense the making of any kind of studies that, in my opinion, would be helpful or useful, that there is no bar in the present method of accounts to any sort of cost ascertainment, that it is more or less inevitable that on the present basis of accounts, on the Bureau's suggested basis or the various bases that have been suggested by the accounting officers from time to time, any of those must necessarily carry with them the necessity, in my opinion, of making special studies, because those special studies cannot be determined in advance because it is impossible to know what kind of studies will be found useful. In my opinion, we should look to the simplification of the regular accounting reports rather than to their extension, that under the plan suggested by the Traffic League or any plan which looks toward what might be thought of as a cost accounting plan, that no one is going to get the benefit from such a plan that it is hoped, that special studies must now be made, must be made under that plan, must be made under any plan, and therefore so far as current accounts are concerned, a relatively simple plan, either along with this or whatever modification may be determined upon, is the most feasible.

The Adjournment

Mr. Slater's testimony was introduced during an interruption of the hearing on the commission's depreciation order, which was resumed on March 14. On March 15 an adjournment was taken to March 19, after which four days was devoted to hearing testimony on behalf of telephone companies on the commission's order relating to telephone depreciation. On March 23 and 24 several of the railroad witnesses who had testified at the previous hearing on depreciation were recalled for cross-examination by counsel for the commission and the National Industrial Traffic League and on March 26 testimony was given by several consulting engineers and manufacturers, as representatives of the Taylor Society, regarding the use of cost accounting in industrial practice. Several of the witnesses pointed out the great differences between manufacturing practice, where costs can be directly allocated, and that of the railroads where so many elements of cost can only be separated by some arbitrary basis of apportionment.

New Southwestern Merger Plan Filed

WASHINGTON, D. C.

A REVISED plan for a unification of control of the Missouri-Kansas-Texas, the Kansas City Southern and the St. Louis Southwestern, under the control of the former, was filed with the Interstate Commerce Commission on March 27, taking the place of the plan for the acquisition of control of the other two companies by the Kansas City Southern which was disapproved by the commission about a year ago.

The Missouri-Kansas-Texas in the new application asks authority to acquire control, in a manner not involving consolidation, of both of the other two companies or either of them, if the commission should not approve its control of both, by acquisition of a majority of their stocks by exchanging its own stock or by purchase for cash at prices to be approved by the commission.

It is proposed to acquire 135,000 shares of the preferred stock and 20,000 shares of common stock of the St. L. S. W. now held by the Kansas City Southern, for a payment of $13,613,301 and interest from July 23, 1926. The remaining 63,936 ½ shares of the preferred stock and 143,561 shares of common stock, or so much as may be obtainable, it is proposed to acquire by exchanging for each share of the preferred stock one share of M.-K.-T. 5 per cent cumulative preferred stock plus $5 a share in cash, and for each share of common stock 2¼ shares of M.-K.-T. common. The applicant also reserves the option of paying for the shares in cash at prices approved by the commission.

Subject to the approval of the commission the applicant proposes to acquire control of the Kansas City Southern by exchanging nine-tenths of a share of its 5 per cent cumulative preferred stock for each of the 210,000 outstanding shares of K. C. S. preferred stock and 1½ shares of its own common stock for each of the 299,599 shares of K. C. S. common, or by purchasing the shares for cash at prices approved by the commission.

At present, the application says, the Kansas City Southern holds approximately 330,900 shares of the common stock of the M.-K.-T. and the plan contemplates that the K. C. S. shall liquidate this as soon as market conditions permit, through the sale of such stock from time to time, or by granting subscription rights to all or any part of it, or by trusteeing for sale all or any part of it, or by any combination of such methods.

"Of the larger independent carriers in the southwestern region," the application says, "practically the only ones remaining which are not already incorporated or proposed to be incorporated in one of the major systems are the Kansas City company, the St. Louis company and the applicant. It logically follows that it is in the public interest, as well as the interest of each of the companies, that steps should be taken to carry out the purposes and policies of the transportation act by including these roads in a large system, capable of conducting transportation with greater efficiency and economy and with a combined financial strength adequate to meet the competition of the other major systems in the southwestern region, which would be impossible if the operation of these three carriers be continued as unrelated lines."

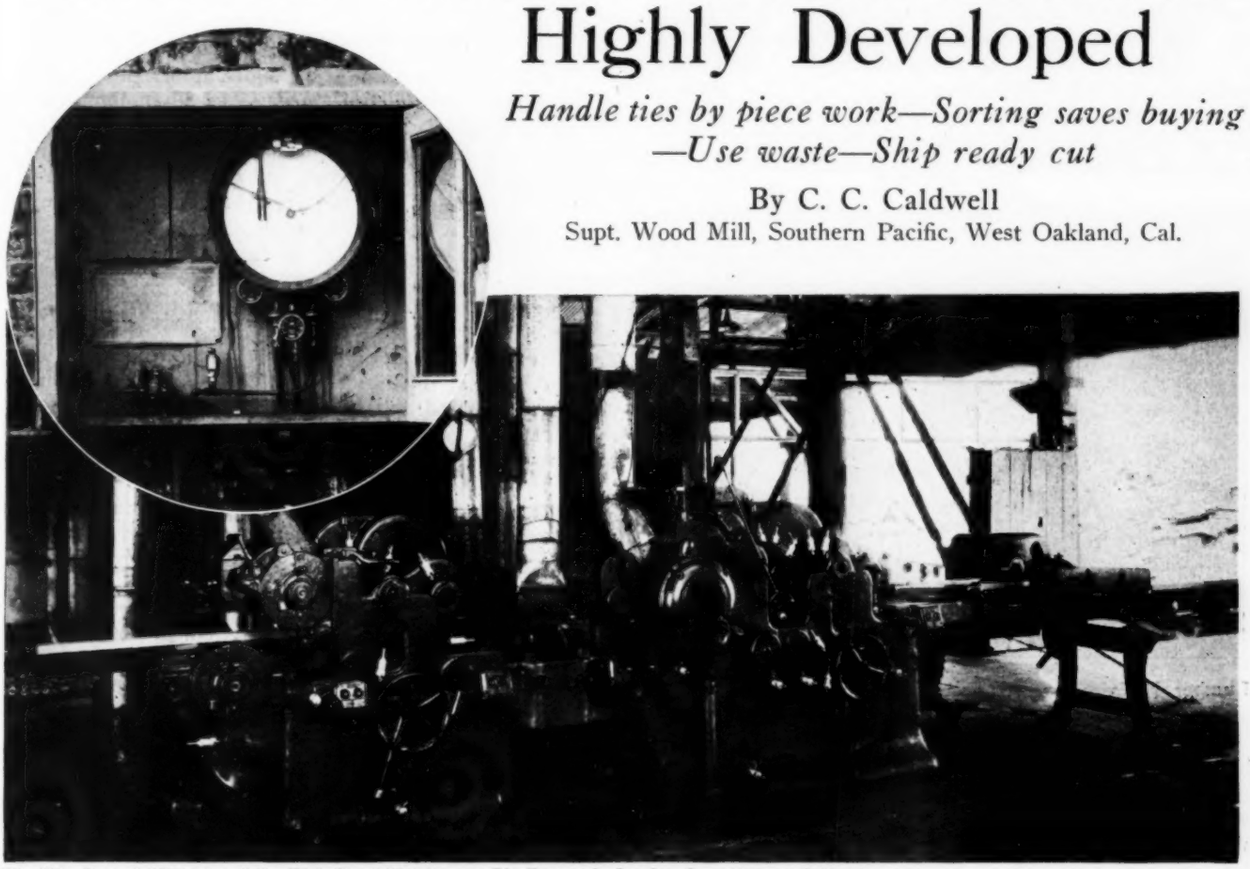
Referring to the short lines in its territory the applicant says that it "recognizes that the policy of Congress embodied in the Transportation Act, as interpreted in the decisions of the commission, contemplates the absorption by the larger systems of short and weak lines, and, in connection with the proposed acquisitions of control, desires to make appropriate provision for such of the short or weak lines connecting with the lines of the proposed system as the commission may duly determine should be continued in operation and should be allocated to the proposed system." At the hearing, it says, it will present detailed data with regard to short and weak lines connecting with the proposed system and will make what it regards as appropriate suggestions as to how the situation of each should be handled.

The application also asks authority for the issuance by the Missouri-Kansas-Texas of 252,936½ shares of its 5 per cent cumulative preferred stock, Series B, 772,410½ shares of its common stock without nominal or par value, and such additional number of shares of its preferred and/ or common stock and/ or other securities, as may be authorized by the commission to be issued for use in connection with the acquisition by the applicant of properties or securities of short and weak lines and for the cash requirements of the plan.

Southern Pacific Lumber Methods Highly Developed

Handle ties by piece work—Sorting saves buying —Use waste—Ship ready cut

By C. C. Caldwell
Supt. Wood Mill, Southern Pacific, West Oakland, Cal.



The Kiln Control (Upper) and the High Speed Matcher are Big Factors in Lumber Operations at Oakland

THE general stock of bridge and building lumber and the largest of four tie yards on the Pacific lines of the Southern Pacific are maintained at West Oakland, Cal., which is centrally located and convenient to water as well as rail shipping. The stock there normally comprises 10,300,000 ft. b.m. of bridge and building lumber, 280,000 lin. ft. of piling, 33,000 ft. of telephone poles, and 800,000 cross ties; while the annual turnover aggregates 24,000,000 ft. b.m. of bridge and building lumber, 440,000 lin. ft. of piling, 87,000 ft. telephone poles and 1,400,000 cross ties.

This yard is operated by the store department. It includes dry kilns for seasoning and a planing mill where the store department handles all sawing, milling and shaping of lumber, sash and doors and where it does cabinet work, frames all timber to be creosoted, and makes ladders and signs for maintenance of way work for the system, and also boxes, trunking, crossarms, etc., for the signal and train lighting departments. At this point, the store department also maintains a shop for the repair of all hand cars, motor cars, push cars, velocipedes, warehouse trucks and baggage trucks for the central district, while the maintenance of way department operates a modern creosoting plant for the treatment of all piles, poles and structural material for the system and for the treatment of cross ties for the central portion of the system. The latter contains a tie boring and incising machine which handles about 3,000 ties each 8-hr. day.

The available space at West Oakland is somewhat congested which usually makes it out of the question to provide two piles of each kind of material stored, one for stock in the process of seasoning and the other for stock being used; but except for this, practically all work, equipment or methods in the yards have been adopted because they serve some useful purpose in connection with the purchase, handling, shipping, care or replenishment of material.

Cross ties and bridge stringers are usually received at this yard in straight carload shipments and the other sizes principally in mixed cars, while all stock except flooring, ceiling and rustic is purchased rough green. Materials are unloaded wherever possible by locomotive cranes. Bridge stringers and heavy timbers are handled with timber tongs while small timbers and boards are lifted in sling lots to the top of the bearings after which they are repiled by hand. Cross ties are handled exclusively by hand on a piece work or contract basis, while all other handling of lumber is paid for on an hourly basis.

Regrading Pays

As the lumber unloaded, it is regraded and all clear stock and good cutting grades are set aside to be kiln-dried for the manufacture of building trim, case work, etc. In this manner, about 45,000 ft. b.m. or 90 per cent of the requirements of the upper grades of fir and redwood is obtained from merchantable grades of lumber instead of by purchase at the higher prices charged for select stock.

Newly sawn lumber is not suitable for use in any

fabricated article. It requires conditioning, during which the elements, vegetable growth in the form of fungus, and animal life in the form of insects, and careless handling are continually at work in an effort to reduce cut lumber to the soil, and it requires intelligent effort to defeat these agencies and keep the lumber and mill products in the best condition for their various uses. Concrete pedestal blocks supporting creosoted fir bearing stringers keep the lumber off the ground. The height of the pedestals is stepped to give a pitch to the

Lumber Buggies Carry Lumber Direct from Milling Machines to the Cars

bearings to drain water, and the bearings are high enough to provide ample circulation. The space under and adjacent to the lumber bearings is kept free from weeds and rubbish and is drained as well as the elevation and flat ground will permit. Each of the bearings is numbered and the stock is generally laid out in book order while metal tags, painted white with black letters, are nailed to the face of the bearing stringers to identify all the material.

Redwood in heavy sizes is frequently stacked solid. This material is generally used in contact with the soil so that drying is not beneficial and the stock is not subject to deterioration when so piled, excepting after a long period of time. All other yard stock is piled with spaces between the adjacent boards to provide ventilation. Sticks are placed at the ends of the stock and at close intervals between the ends, depending upon thickness of stock. These are also kept in a vertical position to keep the stock straight, and the fronts of the piles are battened out on the high side to form a water shed.

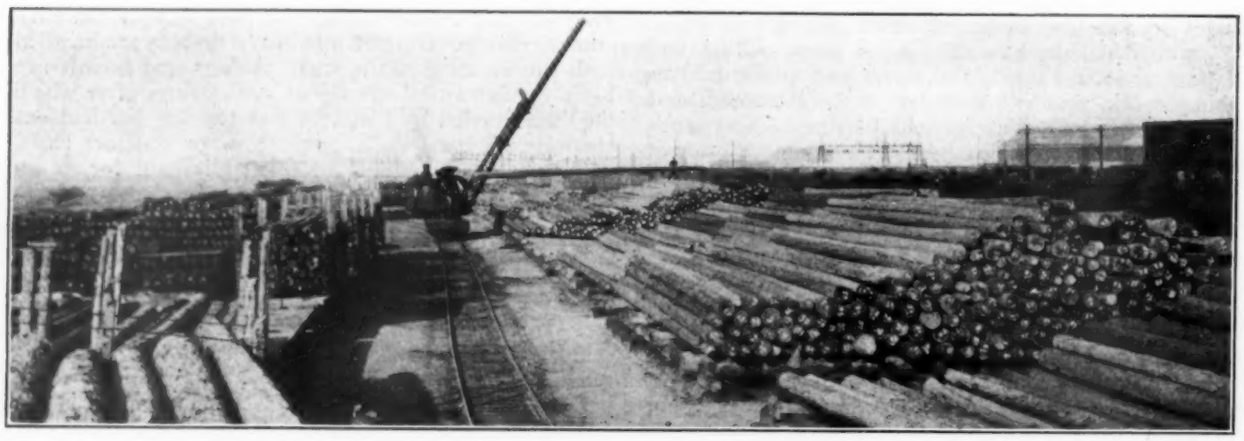
Kilns Prevent Shrinkage

All stock for building trim, signs, doors, boxes, etc. is kiln-dried. Two-compartment kilns 52 ft. long, having an average capacity of about 50,000 ft. of stock monthly, are installed for this purpose. Stock for inside trim, sash and door work and case work is dried to a moisture content of 6 per cent, and material for exterior use is dried to a moisture content of 10 per cent.

All material to be dried is carefully stacked in a horizontal position on kiln cars using 1-in. by 1½-in. sticks to separate all stock up to 1½-in. thick, and 1¾-in. by 1¾-in. sticks for heavier stock. The sticks are placed 24 in. apart for 1-in. stock and 36 in. apart for stock over 1 in. The sticks are kept flush with the ends of stock to retard end splitting. Care is taken to keep the sticks in a vertical position. The loads are prepared to provide a tapered space in the center of the mass to distribute the heat properly.

The kilns are automatically controlled for both heat and humidity by Foxboro recording heat and humidity controllers. Their action is positive and dependable and a glance at the charts indicates any failure in the steam pressure to the heating coils, air pressure to the instruments or leakage in the air-operated control valves, etc. The drying schedules were originally based upon information compiled by the Forest Products Laboratory at Madison, Wis., but have since been revised to meet local conditions.

The steps in the drying schedules are based entirely upon the condition of stock in the kilns as determined from samples and not any time element. In making up kiln charges, one or more samples are cut from the center of average specimens of the stock. These samples are 24 in. long and the full cross section of the board. Test pieces about ⅜-in. long are cut from the ends of the sample, weighed and dried in an electric drying oven and then re-weighed, the difference in weight being the moisture content. The end grain of the original sample is then sealed with paint, the samples weighed and calculations made to determine what the samples will weigh at the various changes in drying schedules. The samples are then placed in pockets in the kiln charge and are taken from the kiln daily or oftener and weighed to determine the progress of drying.



In the Pile and Pole Yard from Which About 500,000 lin. ft. Are Shipped a Year

The stock is given initial, periodic and the final steamings at temperatures higher than the drying schedule for the purpose of softening the outer fibers to assist the flow of moisture from the center to the surface of the stock and to relieve tension in the stock. Pronged samples are cut from the stock during the latter part of drying period to determine the amount of stress between the inner and outer fibers. These stresses are relieved by special steam treatment.

It is only by carefully handling the drying and by protecting the stock after drying that material suitable for case or trim work can be obtained. Since the yard is located in a district of high humidity, kiln-dried stock is placed in a special storage shed which has an open slat floor. Under this floor are low pressure steam heating coils regulated by hand valves, and a temperature is maintained to reduce the relative humidity to a point where the moisture content of stock dried to six per cent will remain constant. A wet and dry bulb hygrometer is kept in this dry storage shed to determine the humidity of the shed, and samples of the stock are stored in various locations and weighed from time to time.

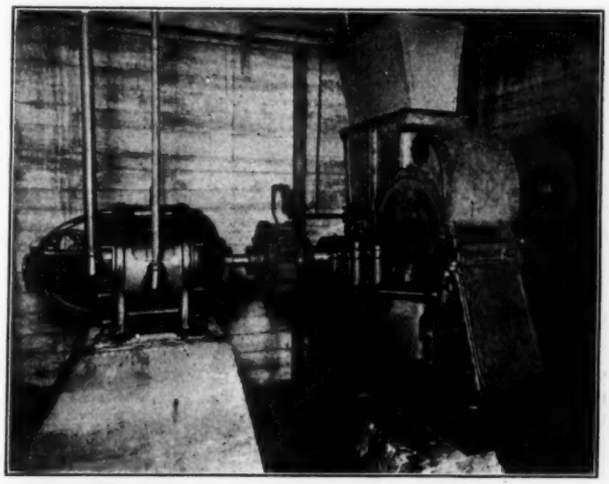
Cost of Handling Reduced

The movement of dressed lumber and finished mill work is controlled to meet the demands of the using departments without any avoidable rehandling of the stock. This work is handled by an assembly foreman who receives all requisitions for stock from the mill. He classifies these requisitions and releases the work in time to be complete at a pre-determined date. Thus, orders for sash and door work and case work are released in advance of orders for straight milling which are held until about two days before date of shipment. This method of handling consolidates carload shipments for supply train or way freight delivery and it releases the lumber trucks loaded with completed material promptly.

Sash, doors, frames and case work, if completed before the jobs are ready to move forward, are checked into an assembly warehouse and held for shipment, and to expedite the completion of orders and to reduce manufacturing costs by eliminating machine set-ups for small orders, it is the practice to carry a full line of sign blanks, completely machined parts for sash and doors and frames, and completely machined hand car, push car, baggage and warehouse truck parts.

It was customary at one time to carry stocks of dressed lumber in the most common sizes, but since the installation of a high speed electric matcher, it has been found cheaper to mill this stock as the orders call for it than to rehandle the dressed material, a practice which also reduces the investment in this material which it would otherwise be necessary to carry.

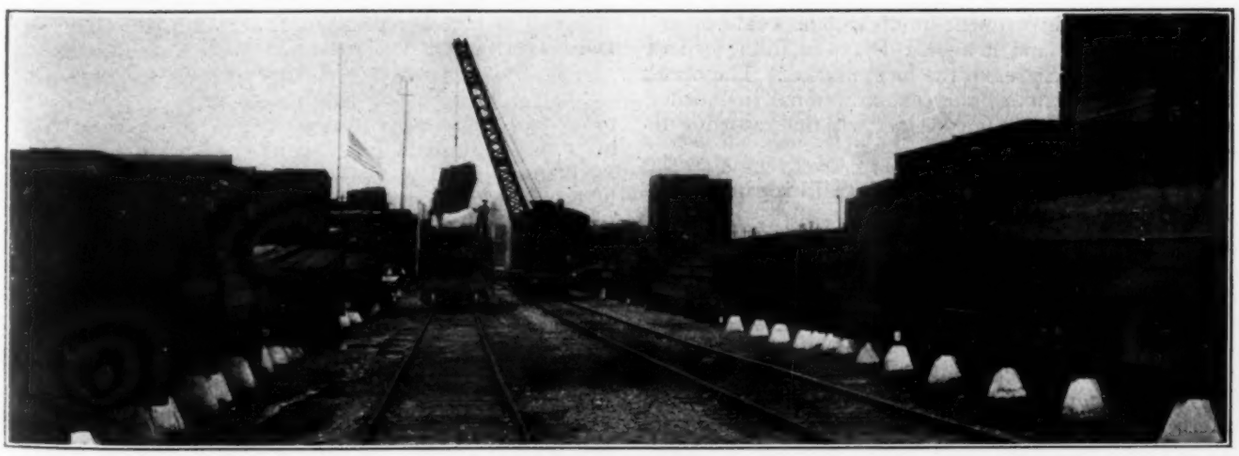
All milled stock is loaded directly into the cars from the lumber trucks. These trucks are handled by Fordson tractors equipped with an automatic coupling device. The cars can be spotted in the lumber yard, store platform, or wherever the major portion of shipment is located under this plan, and the cost of moving lumber on the trucks to any location in the yard is but a few cents per thousand feet.



By Grinding Up Waste This Lumber "Hog" Reduces Power House Fuel Bill 4,744 Bbls. of Oil per Year

Nothing Wasted

Quantities of scrap lumber are shipped to West Oakland. The sound stock is resawn and shaped into road crossing plank, car stakes, chock, auto and paving blocks, rail rack posts, pole stubs, etc. Trimmings and edgings from new stock resulting from the manufacture of mill products are also sorted and made into mouldings, survey stakes, tunnel wedges, cattle guard separators, etc. The latter are classified as reclaimed material because of the difficulties in any attempt to credit this class of material to the orders from which it originated and later to charge its value to other orders. During the past 52 months, there was reclaimed and re-issued



In the Oakland Yard Where Lumber Is Handled by Cranes and Stored on Substantial Foundations

1,598,875 ft. b.m. of various species of stock, all in the form of manufactured articles. This is an average of 40,748 ft. b.m. per month. During one month, when a large number of second-hand stringers were resawn into Wakefield sheet piling, the production was 160,000 ft. b.m.

Sawdust Saves Fuel Oil

A portion of the scrap lumber and the cuttings and edgings is cut into stove wood and issued for company use or is sold to employees while the balance of this class of material is fed into a lumber "hog" and converted into boiler fuel, which is delivered through a blower

Receiving and Storing Switch Ties Which Is All Done on a Piece Work Basis

system direct to the power house fuel bins. The "hog" is directly connected to a 150-hp. motor, and will take 14-in. by 14-in. timbers of any length. It was customary at one time to sell large quantities of scrap lumber in carload lots at prices that would hardly cover the handling and switching charges, and the sawdust and shavings were carted to a dump. Since the installation of a blower system, fuel bins and wood burning boilers, the purchases of fuel oil have been reduced about 4,744 bbl. a year.

Resawing of yard stock is also done at this yard. This makes it possible to conduct business with a considerably smaller investment in stock than would otherwise be necessary and it avoids delays in filling orders or emergency purchases in the local market. The occasion is rare when an ordinary or exceptional rush order for structural stock cannot be met without resorting to purchase.

Cut Building Lumber Before Shipping

At West Oakland, all material for trestles, culverts, road crossings, turntables, tank towers, etc., is delivered to the mill in carload lots by crane and there completely framed, bored and stamped before creosoting, and during the last few months, a new type of service to the maintenance and construction departments has been inaugurated in the practice of furnishing all mill work and framing lumber ready-cut, together with a list for its erection. The lumber is cut to net lengths at the mill as called for by the plans and all mitering, beveling, dapping, etc. necessary to frame the parts is also done and each part is marked corresponding to the item number on the list furnished, so that the erection of the building is greatly simplified and the cost reduced.

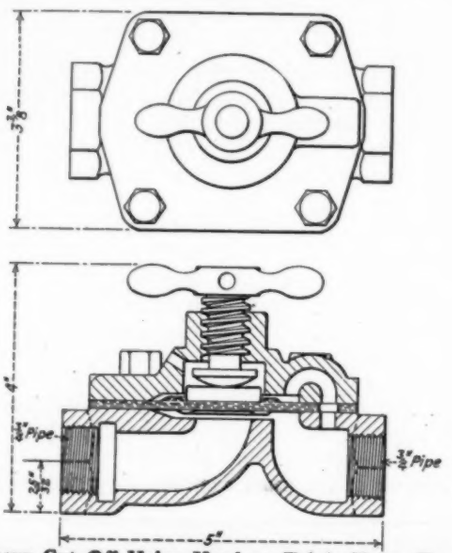
Special Form Stock Book

A special form of stock book has been developed for handling the lumber records. This was done because of the fact that purchase orders are often split among several firms and large numbers of shipments of the same material are frequently made by each firm. It was also desired to show consignors, points of shipment and information as to inspection and delivery on the face of stock book sheets. The new stock book consolidates this information for each item.

Diaphragm Cut Off Valves

THE Westinghouse Air Brake Company, Wilmerding, Pa., has recently placed on the market a line of diaphragm cut off valves designed primarily for replacing the usual key type of cock on triple valve test racks to reduce the possibility of leakage and assure more accurate testing. They are, however, suitable for other purposes where the advantages of tightness, longer life and cheaper maintenance may be essential.

The valve comprises a body and cap between which is clamped a flexible diaphragm that serves as a valve



Diaphragm Cut Off Valve Used on Triple Valve Test Racks to Reduce Leakage and Assure Accurate Testing

to control the passage through the valve when actuated by a threaded stem and T-handle. The diaphragm is adapted to form a seal either on the cap or on the body as the case may be, seat rings being formed on the upper surface and lower surfaces for this purpose.

When the handle is turned clockwise the diaphragm is forced downward against a seat on the body, thereby preventing flow of air through the valve. Only a slight pressure of the screw is required to accomplish a bottle-tight closure. When the handle is turned counter clockwise, the force holding the diaphragm down, is relieved. Air pressure underneath then lifts the diaphragm from its seat on the body, thereby opening the air passage and seals it against the cap to prevent leakage around the stem.

Florida Travel Illustrates Increase in Passenger Service

Development since 1887 marked by improved schedules and equipment and larger territory served

PASSENGER travel from all parts of the United States to Florida during the period from November, 1927, to March, 1928, exceeded that handled during the same period last year by about five per cent according to estimates made by several carriers participating in this traffic. This year the heavy movement occurred during February, while in previous years travel started in October, reached a peak in December and January and then declined during February and March. If the volume experienced in February continues during March and April, as is expected, the total movement for the season will be about 10 per cent greater than last year. Previous to the winter of 1920-21 the normal growth in this business averaged 5 per cent each year, while in the succeeding four years the increase was ten per cent each year. In the year 1922-23 the estimated number of people traveling south totaled about 415,000, while the following year it had increased to 456,400. In 1924-25 a 64 per cent increase brought the total to 752,000 passengers. This record however, was shattered in the following year by a decline of 48 per cent, to a total of 390,000 passengers. In 1926-27 the movement totaled approximately 457,400 people which was on a par with the travel of 1923-24. This year the figure is estimated at 461,000.

Movement This Year Peculiar

The most outstanding feature of this year's movement is the delay in the peak. This was particularly noticeable in the western territory where the total movement from October 1 to February 5 was below that during the same period last year, but where the movement that has occurred since February 5 has brought the total for the season above that of last year. In the east the season started with a slight increase during the early weeks and like the western territory received a greater impetus during February. The privately owned automobile this year has also absorbed more than its normal share of the traffic, judging by the increased number of foreign cars in Florida, particularly from the west.

A Lounge Car of Today

The characteristics of Florida traffic are many. People from the larger cities, particularly those of the east, usually visit the east coast, while those of the rural district travel to the west coast. The movement southbound to the east coast usually starts in October and drops to a low point about April 1, the peak of the traffic being handled in January. The northbound movement ordinarily starts in March and ends about May 1. The west coast movement usually starts later and ends later than that to the east coast.

The origin of Florida traffic is also interesting. It is estimated that approximately 58 per cent comes from the New England, South Atlantic, and Middle Atlantic states, while the remaining states furnish 42 per cent.

A Modern Dining Car of the Seaboard

First Through Train Run in 1887

Through service was provided to Florida from different parts of the United States prior to 1887, but on January 9 of that year, the first through train, the Florida Special, was run by the Atlantic Coast Line from New York to Jacksonville, Fla., over the Pennsylvania, the Richmond, Fredericksburg & Potomac, and the Atlantic Coast Line, carrying 75 passengers. This service was sponsored by George Pullman, then president of the Pullman Palace Car Company, who financed the construction of the cars used in the train. It was the second electrically lighted vestibule train ever operated in the United States and consisted of drawing-room cars, containing a library, a reading room, a smoking room and a buffet, a dining car, sleeping cars and a baggage car which housed the dynamo for the electric lights. This train, which ran tri-weekly, left New York at 9:45 a.m. and arrived in Jacksonville at 3:45 p.m. the following day, covering the 1,074 miles in 31 hours, this being the fastest schedule ever attempted,

up to that time. It offers quite a contrast to the present daily fast service which operates on a schedule of 24 hours. The equipment of modern trains, in comparison, includes lounge and recreation cars in which are located baths for both men and women (one-third of the car being used for women's smoking compartments, baths, retiring rooms, etc.,) a soda fountain where soft drinks, cigars, cigarettes and light lunches can be obtained; drawing room, open section, and compartment sleeping cars; observation cars; club cars and dining cars.

Another of the early trains was added during the tourist season of 1902-03 when the Seaboard Air Line established the Seaboard Florida Limited. With a club car, two Pullman sleeping cars with drawing-rooms, sections and compartments and a ten-section observation car. The combined weight of these cars was a little more than 150 tons, this being before the era of steel equipment. The Seaboard Florida Limited was resplendent in highly polished mahogany, nickel and brass and was lighted throughout with electricity generated by a dynamo in the baggage end of the club car.

Andrew Carnegie, attracted by the announcement of the Seaboard Florida Limited's schedule, requested that a private car be attached to it. The Seaboard's representative in New York, who thought that any request from Mr. Carnegie should be complied with, was somewhat appalled when requested to advise him that the Seaboard Florida Limited, operated on the fastest schedule ever attempted between New York and Florida, would be run on time and would not handle extra cars. Mr. Carnegie was informed that he could be accommodated with drawing-rooms and compartments in the regular equipment. This was satisfactory to the steel magnate, but when he requested that a special stop be made, the representative was again instructed to tell him that no extra stops would be made in order that the train could be operated on time and to explain that a local train from the nearest regular stopping point could carry Mr. Carnegie to his destination on a quicker schedule than he had ever before enjoyed.

Many New Trains Added Since 1887

From 1887 to 1919 travel to Florida experienced a normal increase of about five per cent each year and this necessitated twelve additional trains. In 1889 the Coast Line Florida Mail and the West Indian Limited of the Atlantic Coast Line—two trains which had been operated since the early eighties—became regular through trains the year round. In 1899 the St. Louis-San Francisco added the Kansas City-Florida Special a summer and winter train. The Seaboard Air Line placed the Seaboard Fast Mail, a year-round train, in through service in 1900 while the Seaboard Florida Limited, a winter train, was placed in operation in 1901. In the same year, the Chicago & Eastern Illinois established the Chicago and Florida Limited as a winter train and the first through train from Chicago. In 1908 this was renamed the Dixie Flyer and made an all-year train. In 1909 the Illinois Central established the Seminole an all-year train while in 1910 three more year-round trains were added. These included the Gulf Coast Limited and the Palmetto Limited of the Atlantic Coast Line and the St. Louis-Jacksonville Express of the Louisville & Nashville. In 1912 the Cleveland, Cincinnati, Chicago & St. Louis placed the Royal Palm in service during the summer months and the Second Royal Palm in the winter months and in 1915 the Pennsylvania began operating the Southland the year round.

Since 1920 eighteen new trains have been added. In 1920 the Atlantic Coast Line added the Everglades, a summer and winter train, while the Seaboard Air Line placed the Carolina-Florida Special in winter service. In the following year the Seaboard Air Line established the New York-Florida Limited for summer travel and the Cleveland, Cincinnati, Chicago & St. Louis, the Suwaunee River Special for winter service. Two winter trains were placed in operation in 1922, the Floridan of the Illinois Central (the first through train from Chicago to Miami) and the Dixie Express of the Chicago & Eastern Illinois. These were followed by three summer and winter trains in 1923, the Dixie Limited of the Chicago & Eastern Illinois, the Memphian of the St. Louis-San Francisco and the Skyland of the Southern. In 1924 the Atlantic Coast Line added the Havana Special, a year-round train, and the Louisville & Nashville, the New Orleans Florida Limited, a winter train. In 1925 the Seaboard Air Line established the Orange Blossom Special in two sections during the winter, one to the east coast and the other to the west coast, and the Cleveland, Cincinnati, Chicago & St. Louis, the Ponce de Leon, a summer and winter train. In 1926 the Atlantic Coast Line placed the Miamian, a summer and winter train in operation; the Seaboard Air Line, the Southerner, a summer train; and the Cleveland, Cincinnati, Chicago & St. Louis, the Flamingo, a summer and winter train; and the Royal Palm De Luxe, a winter train. The Sunnyland, a summer and winter train of the St. Louis-San Francisco, was the only one added in 1927.

The growth of this business has been phenomenal in that it has increased to over 700,000 passengers in 1924-25, while the one tri-weekly train in 1887 has increased to 32 trains in 1928. In the operation of the first train three railroads participated, while at present fourteen different roads haul through trains to Florida and twelve others handle connecting through cars. The first train contained eight cars, while modern trains contain as many as thirteen, and are often run into two or more sections.

A marked improvement in the interior decoration of cars also has taken place. The original mahogany carved woodwork, the nickel and brass fittings, the highly polished berth fronts, the mirrored panels, and the heavy drapes are extinct. Modern cars are finished in soft, restful tones with touches of color after the Spanish manner. Furnishings of walnut and reed are in keeping with the English linen draperies, the decorative motif of panels and rugs, and the excellent lighting system which consists of side lights and antique candelabra.

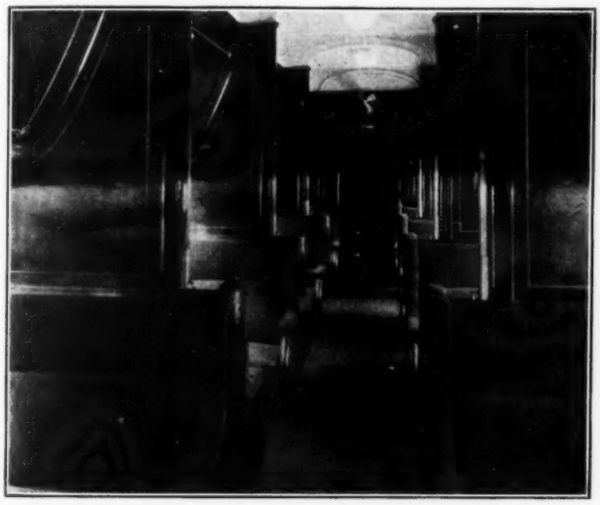
A Variety of Routes Offered

A greater variety of routes also exist at the present time. The Gulf Coast Limited, the Miamian, the Florida Special, the Coast Line Florida Mail, the Palmetto Limited, the West Indian Limited, the Everglades and the Havana Special use the Pennsylvania from New York to Washington, the Richmond, Fredericksburg & Potomac, from Washington to Richmond, Va., the Atlantic Coast Line from Richmond to Jacksonville and the latter road and the Florida East Coast from Jacksonville to other points in Florida. Connecting cars on these trains are run over the New York, New Haven, & Hartford from Boston, Mass.; over the Canadian Pacific and the Pennsylvania from Toronto, Ont., and Buffalo, N. Y.; over the Pennsylvania from Cleveland, Ohio, and Pittsburgh, Pa.; and over the Atlantic Coast Line from Norfolk, Va., and Winston-Salem, N. C.

The Seaboard Fast Mail, the Southerner, the Orange Blossom Special, the New York-Florida Limited, the Seaboard Florida Limited, and the Carolina-Florida

Special use the Pennsylvania from New York to Washington, the Richmond, Fredericksburg & Potomac from Washington to Richmond and the Seaboard Air Line from Richmond to Jacksonville and other points in Florida. These trains carry connecting cars from Quebec, Que., Montreal and Ottawa over the Canadian National and the Canadian Pacific in conjunction with the New York Central, and over the Canadian National and the Canadian Pacific in conjunction with the Central of Vermont, the Boston & Maine, and the New York, New Haven and Hartford; over the New York, New Haven & Hartford from Boston; over the Canadian Pacific and the Pennsylvania from Toronto and Buffalo; over the Pennsylvania from Erie, Pa., Cleveland, Ohio and Pittsburgh, Pa.; and over the Norfolk and Western from Norfolk.

The Skyland Special is run over the Southern from Asheville, N. C., to Jacksonville. The Suwaunee River Special, the Ponce de Leon and the Royal Palm use the Cleveland, Cincinnati, Chicago & St. Louis from Cleveland and Chicago to Cincinnati. The Flamingo operates over the Big Four from Cleveland to Cincinnati, the Louisville & Nashville from Cincinnati to Atlanta, Ga., the Central of Georgia from Atlanta to Albany, the Atlantic Coast Line to Jacksonville and the latter road and the Florida East Coast to other points in Florida. The other trains excepting the Suwaunee use the Southern from Cincinnati to Jacksonville, and thence the Seaboard Air Line. The Suwaunee operates over the same route to Hampton, Fla., thereby omitting Jacksonville. Connecting cars are run over the New York Central from Buffalo; over the Michigan Central and the Cleveland, Cincinnati, Chicago & St. Louis from Grand Rapids, Mich., Detroit and Toledo, Ohio; over the Pere Marquette and the Baltimore & Ohio from Detroit and Toledo; over the Louisville & Nashville from Louisville, Ky., (for the Flamingo,) and over the Southern from St. Louis, Mo., and Louisville.



A Modern Sleeping Car

The Southland is operated by the Pennsylvania from Chicago to Cincinnati, the Louisville & Nashville from Cincinnati to Atlanta, the Central of Georgia from Atlanta to Albany, the Atlantic Coast Line to Jacksonville and the latter road and the Florida East Coast to other points in Florida. Connecting cars are run over the Louisville & Nashville from Louisville.

The Dixie Limited, the Dixie Express, and the Dixie Flyer are operated by the Chicago & Eastern Illinois from Chicago to Evansville, Ind., the Louisville & Nashville from Evansville to Nashville, Tenn., the Nashville, Chattanooga & St. Louis from Nashville to Atlanta, the Central of Georgia from Atlanta to Albany, the Atlantic Coast Line to Jacksonville and the latter road and the Florida East Coast to other points in Florida. Connecting cars are run from St. Louis over the Louisville & Nashville. The New Orleans Special carries Pensacola cars over the same route to Nashville and then over the Louisville & Nashville to Pensacola.

Highly Polished Berth Fronts and Electric Lights Were Featured in the Early Days of Florida Travel

The Floridan and the Seminole are operated by the Illinois Central from Chicago to Birmingham, Ala., the Central of Georgia from Birmingham to Albany, the Atlantic Coast Line to Jacksonville and the latter road and the Florida East Coast to other points in Florida. Connecting cars are run over the Illinois Central from Peoria, Ill., and St. Louis.

The Kansas City-Florida Special and the Sunnyland are run by the St. Louis-San Francisco from Kansas City to Birmingham, the Southern from Birmingham to Jacksonville and the Seaboard Air Line, and the Florida East Coast to other points in Florida. The Memphian is a St. Louis-San Francisco train from St. Louis and connects with the Kansas City Florida Special. Connecting cars are run over the Chicago, Rock Island & Pacific from Denver, Colo., and Colorado Springs.

A "Florida Special" Dining Car of 1887

The St. Louis-Jacksonville Express uses the Louisville & Nashville train from St. Louis to Montgomery, Ala., and the Atlantic Coast Line to Jacksonville. The New Orleans-Florida Limited runs via the Louisville & Nashville from New Orleans to River Junction and the Seaboard Air Line to Jacksonville with connecting cars over the Southern Pacific from Los Angeles, California.

Equipment Combined

The Florida East Coast combines the equipment turned over to it into seven trains, which are operated to Miami or Havana. Its Dixie Flyer carries eight cars from the Dixie Flyer, the Seminole and the Everglades. Its Royal Palm contains cars from the Royal Palm and the Kansas City-Florida Special. Its Miamian is made up of cars from the Miamian and the Southland.

Its Havana Special contains cars from the Havana Special. Its Floridan consists of cars from the Floridan and the Ponce de Leon. Its Royal Poinciana contains cars from the Dixie Limited, the Palmetto, and the Flamingo. Its Florida Special is made up of cars from the Florida Special and the Palmetto Limited.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading during the week ended March 17 amounted to 942,086 cars, a decrease of 59,846 cars as compared with the corresponding week of last year and of 34,932 cars as compared with 1926.

Grain Loading Higher

Loading of grain and grain products and live stock was larger than a year ago but other commodity classifications showed a decrease, principally coal and miscellaneous freight. Coal loading totaled 160,365 cars as compared with 206,219 cars in the corresponding week last year. Loadings by districts were generally lower than a year ago, except in the Northwestern district. The summary, as compiled by the Car Service Division of the American Railway Association, is as follows:

Revenue Freight Car Loading

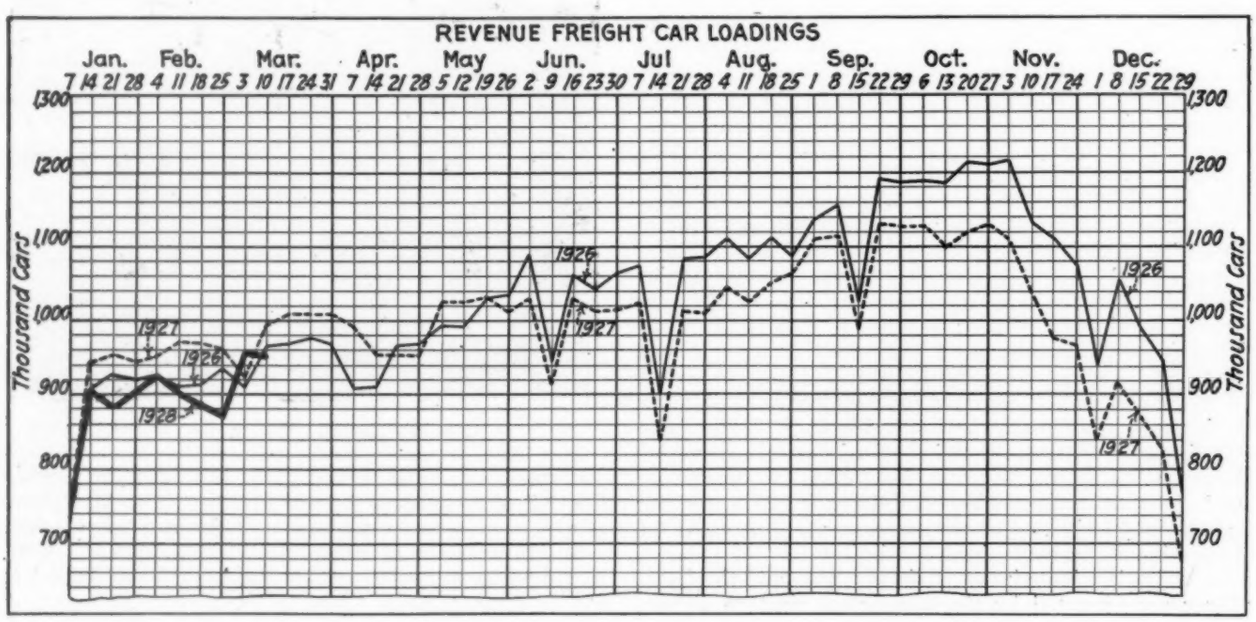
Week Ended Saturday, March 17, 1928

Districts	1928	1927	1926
Eastern	213,502	234,813	237,306
Allegheny	186,395	212,005	197,924
Pocahontas	53,667	59,051	51,479
Southern	158,493	165,783	163,667
Northwestern	119,595	115,062	119,563
Central Western	136,134	139,295	133,907
Southwestern	74,300	75,923	73,172
Total Western Districts	330,029	330,280	326,642
Total All Roads	942,086	1,001,932	977,018
Commodities			
Grain and Grain Products	44,418	37,861	40,482
Live Stock	29,218	26,971	29,446
Coal	160,365	206,219	183,205
Coke	11,094	12,161	14,319
Forest Products	67,136	71,790	79,240
Ore	8,138	10,955	10,941
Merchandise L.C.L.	260,433	264,678	265,638
Miscellaneous	361,284	371,297	353,747
March 17	942,086	1,001,932	977,018
March 10	951,553	1,000,754	967,425
March 3	959,537	989,863	965,009
February 25	869,590	918,858	912,935
February 18	887,891	954,794	932,281
Cumulative total, 11 weeks	9,890,593	10,551,127	10,273,480

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended March 17 totalled 65,090 cars, which was an increase of 2,593 cars over the previous week and which was also an increase over the same week last year of 2,962 cars.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
March 17, 1928	65,090	45,380
March 10, 1928	62,497	43,370
March 3, 1928	64,382	43,533
March 19, 1927	62,128	43,079
Cumulative Total for Canada		
March 17, 1928	692,396	431,980
March 19, 1927	665,724	424,932
March 20, 1926	605,870	402,397



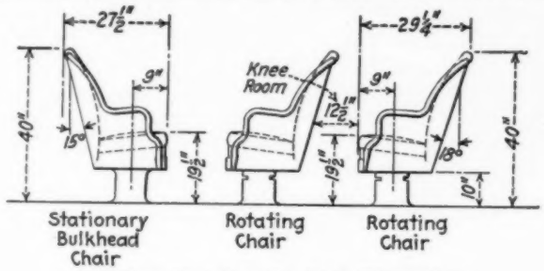
D. L. & W. Remodels Day Coach

Sample car equipped with rotating two-passenger chairs for through train service

THE Delaware, Lackawanna & Western recently remodeled one of its all-steel, wide vestibule coaches by redecorating the interior and installing Hale & Kilburn No. 900, rotating two-passenger chairs. The car, which was built new in March, 1926, has an overall length of 75 ft. 1½ in. and a length over the body of 65 ft. 9 in. The outside width is 9 ft. 8 in. with an inside width of 8 ft. 10½ in. It has a seating capacity with the new chairs for 80 persons.

This car, which was remodeled primarily to ascertain the reaction of the day coach passenger toward a car thus equipped, has been placed in service on the Lackawanna Limited between Buffalo, N. Y. and Hoboken, N. J. According to reports, it has received many favorable comments from passengers who have ridden in it.

The interior is tastefully finished in basic colors of green, brown and cream. The head and side linings of the deck are cream colored, relieved with ¼-in. stripings of gun metal blue and 1/16-in. stripes of tan. The clerestory is similarly treated. Beaver brown with sage green for panels are the colors used for the side and end finish. This is relieved by corner ornaments appropriately placed and striping of gold leaf and Tuscan red, together with lines of cerise. The entire interior surface has been varnished and rubbed to a smooth, dull satin finish. The exterior of the car is finished in dark olive green with lettering done in gold leaf.



Drawing Showing the Seat Dimensions

Chairs Have High Backs and Are Equipped with Foot Rests

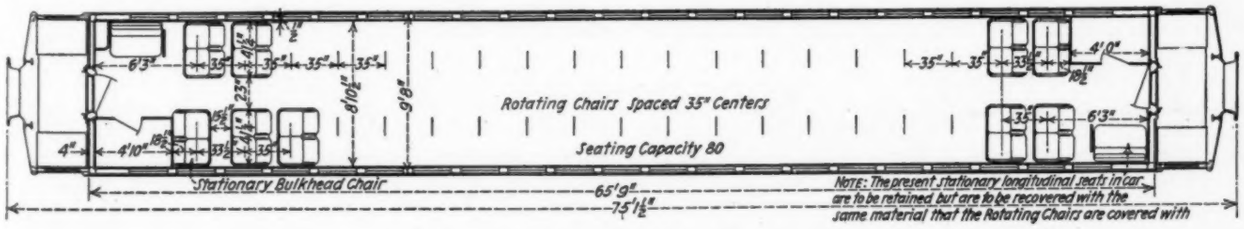
The feature of this car is the design of the chairs with which it has been equipped. The detail dimensions of the chairs and spacing are shown in one of the drawings. The overall height from the floor to the top of the back is 40 in. with a distance of 19½ in. from the floor to the front edge of the seat. The backs of the rotating chairs have an 18-deg. slope, while the stationary bulkhead chair has a slope of 15 deg. Each chair has a total width over the arm rests of 41¼ in. They are spaced 35 in. from the center of the pedestals to suit the present window spacing of the car. This arrangement allows 12½ in. knee room.

The chairs are covered with green freize plush which harmonizes with the general scheme of interior decoration. The rear of each chair is equipped with nickeled coat and robe holder, ticket holders, umbrella loops and a foot rest.

Each Seat is Provided with a Coat Holder and Foot Rest

The backs of each chair are of the double bucket design with soft spring upholstering and with a well-defined division between the two seats. The two individual air spring cushion pads which are placed separately on top of an auxiliary spring cushion, form a 10-in. depth of cushioned comfort similar to that found in fine home furniture. A well upholstered arm rest is provided on each end of the seat, of a design that harmonizes with the entire structure of the chair.

The chairs can be conveniently reversed by tripping a releasing and locking device, located in the aisle side of the steel base on which the chairs are supported. This device is arranged to permit the chair to swing away from the wall a sufficient distance to escape any con-


Rotating Chairs Spaced 35" Centers
Seating Capacity 80
Stationary Bulkhead Chair
65'9"
75'1½"
NOTE: The present stationary longitudinal seats in car are to be retained but are to be recovered with the same material that the Rotating Chairs are covered with

Floor Plan of the Remodeled Day Coach

tact with the side finish when turned to the reversed position. In applying the double rotating chairs, the original seating capacity of 80 passengers has been

The Chairs are of the Double Bucket Shape and the Backs are of Sufficient Height to Provide a Rest for the Head

maintained. There are 36 revolving chairs, 2 stationary bulkhead chairs and 2 stationary longitudinal seats, which are shown on the drawing and also in the photographs.

Capacity of a Flat Switch Yard

TO overcome difficulties occasioned by suddenly increased flows of traffic, the general yardmaster of the Burr Oak yard of the Chicago, Rock Island & Pacific at Chicago, has devised an interesting way to distribute his forces and power so as to enable him to handle as many as 570 freight cars over a single-track lead in eight hours, an average of 71 cars an hour.

Burr Oak Yard is a flat receiving yard where all inbound Chicago and connecting line deliveries of the Rock Island are made. Ordinarily the first assignment from 12:01 a. m. to 8 a. m. handles the heavy receipts of live stock, perishable and merchandise for Chicago delivery, and places merchandise at the freight houses, and perishable freight on team tracks for early morning delivery. Non-perishable and dead freight from inbound trains is stored for classification after the perishable, live stock and merchandise traffic has been handled. This results in turning over to the second trick from 100 to 150 cars. In addition there usually is a heavy turnover from the outbound yard to the inbound yard. The second trick crew starts at 8 a.m. with a large volume of unclassified traffic to be handled in addition to such trains as may arrive during the hours of this assignment. This crew handles an average of 250 cars over the lead in eight hours or 31 cars per engine hour, which is a very good performance when it is understood that all inbound trains use this lead, tying up the engine while passing over it, also that the transfers dispatched from this yard are shoved out by the lead engine, and the merchandise transfer house platform is kept supplied by this crew with cars to unload.

At 8 a. m. on the date checked, however, 270 cars of unclassified traffic were in the receiving yard, five of the tracks being full and only one track having room for additional cars. In addition, three tracks were filled with empty automobile cars of different lengths and capacities and one track held 50 cars from the outbound train yard. Before a train arrived, this crew, with one engine, had 390 cars ahead of it to switch in eight hours and four trains in sight to arrive before 3 p. m. with one track open to the extent of 30 cars on which to receive these trains. These trains actually arrived as follows: 57 cars at 12:15 p. m., 48 cars at 2:25 p. m., 39 cars at 2:45 p. m., and 36 cars at 2:50 p. m., a total of 180 cars.

The regular crew on this assignment consists of an engineman, a fireman, a foreman and two helpers. An additional engine was ordered for this lead on this date and an additional helper for the regular crew; this gave the crew one foreman and three helpers. No switching was performed by the second engine, except when it was in charge of the full crew for the assignment, a foreman and two helpers, the only departure from the usual procedure being that the crew had a different engine for each track that was switched. The third helper marked up a track for switching while the remainder of the crew switched a track on the lead. When this track was switched, the engine was backed into the next track to be marked by the field man who had worked on the lead with the engine, the field man who had marked the track for the idle engine taking his place on the lead while the train which he had marked was being switched.

By alternating the field men it was possible for each man to switch his own markings, avoiding confusion and facilitating the operations. This method kept a continuous movement of cars over the lead from the receiving tracks into the classification yard, and eliminated the delays to switching through having to hold the engine and crew while cars were being marked for track identification, as there was always a track chalked for lead switching and an engine moving its cars to the lead as soon as the lead was clear. This was exactly the same process as is carried out in hump yards, where, while one engine is putting cars over the hump, the other engine (with one helper) is moving another cut from the receiving yard to the hump, the only difference being that the third helper in the Burr Oak yard did not have to take the engine as far to get a cut as in the hump yard. Not only did this one crew handle 570 freight cars over the lead in eight hours, but it also switched out and placed seven cars of merchandise to the transfer platform, "shoved" the platform three times, shoved four transfers out of the yard and switched out and placed on the repair tracks one car of gasoline and two manifest loads.

By the prompt handling of the situation in providing a means of keeping the yard open, and cleaning up the congestion on this trick, the next assignment did not require the second engine and was able to handle the traffic without delay or congestion. This double engine crew performed in eight hours, work which would otherwise have required two crews to perform, but which could not have been done as two crews could not work on the lead without interfering with each other. The result was that the congestion which might have lasted indefinitely was cleared up in eight hours with the additional expense of but one engineman, one fireman and one additional helper on the crew.

A Gas-Electric Car In Service on the Reading

What the Gas-Electric Car Means to the Railroads

An outline of limitations and possibilities, supported by performance records

By W. R. Stinemetz

Assistant to Transportation Sales Manager, Westinghouse Electric & Manufacturing Company

THE gas-electric car affords the railroads a better and cheaper means of conducting certain classes of transportation than can be obtained with steam locomotive operation. This fact accounts for its rapid adoption on many railroads during the last two years.

For many years railroading was synonymous with steam locomotives since this was the only motive power unit available for hauling trailing loads on rails. The steam locomotive will for years to come hold its place as the principal factor in railroad work.

The electric locomotive and the multiple-unit car were the first challengers of the steam locomotive for railroad work, and electric propulsion has been used on many railroads to solve special problems of transportation which were becoming a burden under steam operation. Electrification, on account of the large capital investment required, will be confined to areas of congested traffic and heavy demand from the standpoint of load and speed.

The Gas-Electric Car

The gas-electric car in a like manner, because of its lower operating costs, affords a better solution to the light and infrequent traffic conditions of branch line service than either the steam or electric train. Its use not only reduces the high fuel and crew cost of steam operation under such conditions, but also stimulates traffic by furnishing the traveler with much more attractive accommodations than can be found in obsolete rolling stock usually assigned to steam branch line service. The gas-electric car supplies the public with facilities more nearly approaching the gasoline bus, and at the same time enables the railroads to conduct their other classes of service, such as freight, express and mail, in a satisfactory and economical manner.

Each type of motive power has its field of application and the progressive railroad operator is utilizing all three motive power systems to provide modern, comfortable and economical transportation to the public.

To determine a little more definitely just what a gas-electric car does mean to the railroads, let us take a typical example of an average month's operation of a motor car and trailer, actually substituted for a branch line steam train. The steam equipment consisted of a locomotive with its tender, a combination baggage car

and smoker, and a passenger coach. The gas-electric train consisted of a combination motor car with a baggage compartment and smoker, and also a passenger trailer coach. Both trains had the same space accommodations but the steam train accumulated more ton-miles due to the added weight of the locomotive and tender. The length of run was 40 miles with the trains making one round trip per day for 30 days with results as shown in Table I.

Table I—30-Day Record Gas-Electric Versus Steam Train

Items of expense	Gas Elec.	Steam
Fuel (coal or gasoline)	$ 338.20	$ 603.00
Lubricants	17.11	35.00
Water	....	10.00
Cleaning cars or engine	56.52	35.00
Supplies	6.86	35.00
Engineers wages	297.72	297.72
Conductors wages	288.56	288.56
Trainmens wages	214.54	453.46
Firemens wages	....	220.30
Engine house expense	46.87	101.00
Running repairs	210.36	966.00
Totals	$1,476.74	$3,045.04
Average cost per passenger-mile	1.21 cents	2.49 cents
Average cost per train-mile	59.8 cents	123. cents

The gas-electric system shows a net saving of $1,568 per month, or $18,816 per year, largely made from three items, namely: fuel, crew wages and repairs. This amount represents about 31 per cent of the investment for the gas car and trailer without allowing any salvage value for the steam train equipment replaced. The gas car is available during layover periods to do any switching work which the locomotive of the steam train might have been called upon to perform.

It has been possible on other roads to increase savings further by eliminating the brakeman of the train crew. This is accomplished by arranging the two-car unit train as follows. At the front end of the motor car is the power plant and auxiliaries. Immediately behind this is a space of 18 or 20 ft. for baggage and express. Next is the heating plant which takes care of both cars and immediately across the aisle is a toilet. In the rear of the car are seats for 18 people, this compartment being used for smoking. The trailer is made up of a first-class passenger coach, with the forward end equipped with seats for 36 people, making a train capacity, of 54 passengers. The rear 15 ft. of the trailer is equipped for a standard railway working post office. With only one passenger opening in the trailer, all passengers are handled from one platform and therefore the conductor is the only trainman needed.

One road so equipped has in effect a four-car train and is handling the same amount of traffic as the old four-car steam trains, and with better satisfied passengers. The average cost of the steam trains was $1.08 per train-mile whereas the motor train gave the same service for a year at a cost of 38 cents per train-mile. On the above basis, one of these train units costing $60,000 gross would, with a daily mileage of 100, show a saving of $25,550 per year, or 43 percent on the gross investment.

Multiple-Unit Gas-Electric Trains

But this is not the whole story of gas-electric cars and the railroads. When traffic is too heavy for single power units and trailer as described, it is entirely feasible to use multiple-unit-type gas-electric car trains in a manner similar to multiple-unit car operation on a steam railroad electrification.

Multiple operation of gas-electric power plants, or the control of a number of units from one throttle, requiring only one operator, was first accomplished by using double power plants on a single car. Some of these double power plant cars had the throttle control of the two engines connected mechanically, but the later cars are so equipped electrically that the operator can control the car, from either end, or in case several power cars and trailers are connected in one train they can all be operated as one unit from the front end of the train by installing the necessary interconnecting control wires. Cars so equipped are now in service on the Lehigh Valley, the Baltimore & Ohio and Great Northern, while those on the Reading are actually operating in this manner.

In this case the same advantages of such operation over steam trains would be obtained as in electric service, but with the elimination of the capital cost of overhead structure, power transmission and substations required for electric operation. These advantages are: flexibility of train make-up, operation from either end making turning movements unnecessary, rapid acceleration with quick schedule and full powered train irrespective of the length. A further advantage of multiple-unit gas car operation is the possibility of dividing the train into two individual sections at junction points for diverging branch operation as may be required.

An idea of what could be expected in savings with multiple-unit gas car operation under more congested conditions is shown by the following comparison: The division in question is 190 miles long, extending from a large city terminal at one end to a moderate sized city at the other. In addition to several through trains each way daily the large city terminal handles 10 local passenger trains each way, operating in the suburban zone of 40 miles. The smaller city also has a suburban zone of 40 miles, requiring four trains each way daily. To handle the service with steam requires:

6 Pacific-type passenger locomotives—salvage value	$120,000
16 Passenger locomotives (local) salvage value	80,000
75 Cars (passenger and express) salvage value	75,000
Total salvage value	$275,000

To replace this equipment with complete new gas-electric motor cars and revamped steam trailers maintaining the same schedules, and express and passenger facilities would require:

37 Motor cars at $39,500 each	$1,461,500
37 Revamped trailers at $2,500 each	92,500
Total	1,554,000
Salvage value of locomotives and 38 cars	238,000
Net investment	$1,316,000

The annual operating expense based on reliable data would compare as shown in Table II.

Table II.—Annual Operating Expenses

	Steam Operation Cents per train-mile	Steam Operation Total cost per year	Gas-Elec. Operation Cents per train-mile	Gas-Elec. Operation Total cost per year
Crew expense	38.58	$282,720	31.46	$230,557
Fuel (coal or gasoline)	23.90	175,113	19.09	139,879
Locomotive repairs (motor car)	29.7	217,610	6.036	44,227
Locomotive supplies (oil)	1.7	12,359	1.794	13,151
Engine house expense	7.7	56,419	2.414	17,692
Train supplies and car expense	8.0	58,616	2.753	20,172
Total	109.58	$802,837	63.547	$465,658
Cost of yard switching and facilities	.....	55,900	.....	18,650
Total main line and yard	.....	$858,737	.....	$484,308

Here again we have the principal savings centered in crew expense, fuel and maintenance. The heavy cost of steam locomotive repairs shown in this tabulation is what obtains on locomotives which have been in service for some years. On the other hand if we used a new steam locomotive in this comparison, a lower maintenance cost would result. Likewise a much lower total net investment cost would obtain in the tabulation comparing the capital required for steam versus gas-electric, due to the increased salvage value of new loco-

motives. Therefore, the decreased cost of steam operation with new locomotives would be balanced by the decreased cost of fixed charges in gas-electric operation in the above comparison, and the saving would be similar in either case.

Under the above conditions a comparison of the annual operating expenses of the two classes of service is as follows:

	Steam operation	Gas-Electric
Net investment		$1,316,000
Annual operating expense	$858,737	484,308
Fixed charges *	132,217	170,477
Total operating expense	990,954	654,785
Saving over steam operation	.....	336,169
Per cent saving on net investment	.....	25.6
Per cent saving without fixed charges		28.5

* Fixed charges include interest, insurance, taxes and depreciation.

Conclusions

The conclusions drawn from such data are that under properly selected conditions the gas-electric car and trailer, either as a single unit or operated in multiple-unit trains is not only a desirable substitute for the steam train from the standpoint of attracting additional traffic, but economically it is a sound investment.

The fuel costs as compared to steam locomotives are less, largely because standby losses are eliminated since the gas car consumes fuel only when doing actual work. Like the electric locomotive, it materially reduces the heavy maintenance expense always a factor of the steam generating plant of a steam locomotive. It provides a more flexible means of handling the varying crowds of traffic by always having a full powered train irrespective of the size. Yard switching and train make-up in terminals are improved by reducing to a minimum the number of movements for train make-up. The savings effected will permit the net investment to be written off in from four to seven years. The confidence of the public is increased by evidence that the railroad is keeping abreast of the times in furnishing modern transportation equipment with improved service and schedules, and hence traffic will be stimulated.

The term transportation has a much wider significance than ever before. It no longer brings to mind only the sailing vessel or the steam locomotive. The railroads in order to keep "their place in the sun" as great transportation arteries must avail themselves of all modern methods of improved transportation of which the gas-electric car is one example.

Freight Claim Payments Higher

THE claims paid by Class I carriers of the United States and Canada during 1927 totaled $38,713,059 as compared with $38,187,315 in 1926, an increase of $525,744 or 1.4 per cent, according to the report of the Committee on Freight Claim Prevention of the Freight Claim Division of the American Railway Association. This increase was contributed to by five causes.

Concealed damage increased 10.5 per cent or from $2,420,105 to $2,673,474; rough handling, 7.5 per cent or from $9,624,342 to $10,342,269; unlocated damage, 5.6 per cent or from $7,538,047 to $7,960,407; freezing or heater failure, 5.4 per cent or from $724,599 to $764,089 and delay 4.1 per cent or from $3,380,936 to $3,518,613.

Among the causes which showed decreases, fire was responsible for 32.1 per cent less damage in 1927, the amount being $216,802 as compared with $319,416 in 1926. The claims paid for unlocated losses, robberies, and concealed losses decreased from $6,021,043 in 1926 to $5,296,742 in 1927 or 12 per cent. The loss of entire package was reduced 15.5 per cent; robbery of entire package, 6 per cent; concealed loss 11.2 per cent, other unlocated loss, 7.2 per cent and other robberies 20.6 per cent.

The detailed figures for all causes follow:

Causes	1926	1927	Decrease	Increase	Per Cent
Rough handling	$9,624,342	$10,342,269		$717,927	7.5
Unlocated damage	7,538,047	7,960,407		422,360	5.6
Delay	3,380,936	3,518,613		137,677	4.1
Defective equipment	3,047,299	2,939,720	$107,579		3.5
Wreck	2,623,718	2,603,309	20,409		.5
Loss entire package	2,531,459	2,139,057	392,402		15.5
Concealed damage	2,420,105	2,673,474		253,369	10.5
Other unlocated loss	1,873,822	1,739,142	134,680		7.2
Error of employee	920,686	912,480	8,206		.9
Improper handling, loading, etc.	831,755	816,115	15,640		1.9
Robbery entire package	738,940	694,355	44,585		6.0
Improper refrigeration and ventilation	735,369	669,040	66,329		9.0
Freezing or heater failure	724,599	764,089		39,490	5.4
Other robbery	575,561	456,781	118,780		20.6
Fire	319,416	216 802	102,614		32.1
Concealed loss	301,261	267,406	33,855		11.2
Carload	$27,503,678	$28,443,175	$1,045,079	$1,570,823	
Less carload	10,683,637	10,269,884			
Total	$38,187,315	$38,713,059		$525,744	1.4

* * * *

Ewing Galloway

Lackawanna Suburban Train Leaving Hoboken, N. J., Terminal

Railway Prosperity and Its Effect on Business*

"A prosperous national railroad system is the best insurance against depression in business."

By T. C. Powell
President, Chicago & Eastern Illinois

IMMEDIATELY after the war, when the railroads were turned back to private operation ,the railroad managements guaranteed to the public better service, and it is common knowledge that to carry out this guarantee it was necessary for the carriers to make extensive investments as to all parts of the physical property.

A general advance in rates was granted in 1920, but since that date there has been a gradual reduction, and I think that the reduced expenditures of the railroads resulting from such reductions in rates are largely responsible for the present hesitating condition of trade. There is no doubt in my mind that these reductions in expenditures were forced on the carriers by the impending prospect of inadequate returns, and these inadequate returns are the result of low freight rates which are not only below the level of 1921 but are constantly on the decline.

The population of the United States is increasing. The official estimate just published shows that we now number more than 120,000,000 people, a substantial increase over the census figures of 1920, in spite of restrictive immigration laws. As the figures published by the Agricultural Department show that the population on the farms of the United States is decreasing, it naturally follows that this increase in our total population has occurred in the urban communities.

With such an increase in population, amounting to nearly 15,000,000 in eight years, or over 14 per cent, the railroads should be much busier than in previous years and more prosperous as well. It was, therefore, a shock to learn that the net railway operating income of the Class One railroads for 1927 was only slightly more than had been earned in 1916, the difference being less than $2,500,000.

Net operating income of all Class I Railroads in 1927	$1,088,521,873
Net operating income of all Class I Railroads in 1916	1,086,099,400
Increase	$ 2,422,473

And this is in spite of the millions of dollars that have been expended by the carriers since 1916 for cars, engines, tracks, bridges, buildings, safety devices, separation of grades, etc.

The effect which the railroad companies of the United States may have upon the prosperity of the country is because the railroads are something more than mere collectors and distributors of tonnage—they are also great circulators of money, partly through wages and partly through purchases of material.

As buyers, the railroads are credited with a purchasing power of three and a half billion dollars of money annually, and strange enough, this is approximately the same amount as expended annually by the national government for all purposes.

The ability to pay the wages or to make the purchases depends upon the receipts resulting from handling freight, passengers, mail, and express traffic.

The ability to borrow money for capital expenditures is based upon the prosperity of the railroads, and money cannot be secured from the public through the sale of securities or on short-term notes at a reasonable rate of interest unless the earnings are sufficient to justify the confidence of the public.

This confidence is based upon the published figures which are filed with the Interstate Commerce Commission and distributed generally throughout the country by the financial papers and those interested in marketing railroad securities. For that reason, a few figures showing the results for the year 1927 will be of interest.

Railroad operating revenues in 1927 amounted to	$6,206,986,000
Operating expenses in 1927 amounted to	4,626,932,000
Railroads in 1927 paid in taxes	380,638,000
The net operating income for 1927 was only	1,085,485,000
The rate of return on property investment was only	4.4 per cent

It must be understood that the net railway operating income shown above, namely, a little over one billion dollars, augmented slightly by "non-operating" income, is the fund out of which must be paid interest on bonds, interest on borrowed money, rents for leased roads, sinking fund requirements, and dividends on stock.

Comparison with Other Industries

It will also be of interest to contrast the net operating income of the Class I railroads of the United States, as above, with the increase in net earnings of some of the larger corporations in the United States. I quote some of those that have been recently published:

B. F. Goodrich Corporation	$6,635,000
Montgomery Ward & Co.	4,320,000
Sears, Roebuck & Co.	3,100,000
F. W. Woolworth Company	7,150,000
Detroit Edison Company	1,225,000
E. I. duPont de Nemours	4,000,000
Endicott-Johnson Corporation	630,000
American Telephone & Telegraph Company	11,000,000

Of course, not every corporation or individual can show substantial net returns in 1927, but the startling thing is that the railroads of the United States show a decrease in net operating income as compared with 1926 of approximately $150,000,000. Some of the railroads show increases, but 90 per cent of the mileage shows a decrease, and omitting those which show a decrease of less than $1,000,000, I have taken from a condensed statement entitled "Earning Power of Railroads," issued by Jas. H. Oliphant & Co., the Class I railroads which show a decrease in net operating income of more than $1,000,000.

Atchison, Topeka & Santa Fe	$11,475,777
Atlantic Coast Line	7,284,849
Baltimore & Ohio	5,346,623
Boston & Maine	3,340,331
Buffalo, Rochester & Pittsburgh	1,372,313
Chicago & Alton	1,252,882
Chicago & North Western	2,037,445
Chicago, Burlington & Quincy	1,812,523
Chicago, Milwaukee & St. Paul	4,321,998
Cleveland, Cincinnati, Chicago & St. Louis	3,929,216
Colorado & Southern	1,842,362
Delaware & Hudson	3,216,511
Delaware, Lackawanna & Western	1,933,810

* Abstract of an address before the St. Clair River District Transportation Club, Port Huron, Mich., on March 19.

Denver & Rio Grande Western	1,218,762
Duluth, Missabe & Northern	1,973,471
Elgin, Joliet & Eastern	1,435,660
Erie	5,092,022
Florida East Coast	4,575,274
Great Northern	2,077,889
Illinois Central	3,003,996
Lehigh Valley	3,966,838
Louisville & Nashville	3,195,991
Michigan Central	2,576,304
Missouri-Kansas-Texas	1,300,290
Missouri Pacific	3,434,288
New Orleans, Texas & Mexico	1,505,060
New York Central	9,930,775
Norfolk & Western	6,911,200
Northern Pacific	1,620,864
Pennsylvania	2,455,455
Pittsburgh & Lake Erie	1,141,509
Reading	5,242,742
St. Louis-San Francisco	1,107,924
Seaboard Air Line	1,712,806
Southern Pacific	4,192,649
Southern	2,763,721
Union Pacific	2,616,753
Wabash	2,950,406
Western Pacific	2,015,722
Wheeling & Lake Erie	1,350,857

In some instances, individual railroads were subjected to extraordinary expenses, among which may be included the Boston & Maine, a railroad which was seriously affected by the floods in New England, and this may also be said as to the railroads affected by the great floods in the Mississippi Valley, Indiana and Illinois, but whatever the cause of these decreases from the standpoint of natural phenomena, such as crop failures, floods, etc., the fact remains that the purchasing power of the railroads has been materially decreased, and this has a serious effect upon the prosperity of the country.

A short time ago, the Railway Business Association, which is made up of individuals and corporations manufacturing and selling materials for use of railroads made a general inquiry of the Interstate Commerce Commission and the Chairman of the Interstate Commerce Commission expressed this inquiry in the following words: "You desire light on the questions of how rapidly traffic will expand and how much of various kind of facilities and consequent investment will be required, and how high the rate levels should be to enable the railroads to raise this amount of new capital."

Probably the United States leads the world in what is called "mass production," and as long as a manufacturer creates a sufficient demand for his products to enable him to operate his factory continuously with a steady flow of the product to the customer, the problem of mass production is reduced to its simplest proportions.

The Effect of Railway Purchases

But it is claimed by the members of the Railway Business Association that railway purchases are not handled in such a way as to enable the factories to work continuously at a uniform rate of production and that, therefore, the costs of such irregular volume of demand and production are greatly augmented. The association, for that reason, has urged for years that the railroad companies of the United States stabilize their purchases and thus benefit themselves through a reduction in costs of material and, at the same time, benefit the producer by increasing his net return.

There is also the additional benefit of securing to the workmen and all those employed in the manufacturing plants a reasonably steady income, because through those employees there will also result a steady patronage of the retail establishments supplying the necessaries of life.

Regularity of production and uniform volume of distribution are desirable whether the product handled is a mineral, an agricultural product, a product of the forest, or the output of a manufacturing plant.

But how can the railroads adopt a plan of stabilized purchases and of uniform employment if their revenues are kept down to the minimum and even below a safe figure?

Undoubtedly, the manufacturers of railroad material could turn out their product at a lower price if their plants could be operated continuously and without the expense of fluctuating operation, and with such continuous operation the regularity of employment would be of enormous benefit, contributing to the comfort and happiness of thousands of people..

The purchase by a railroad company of any one of the many items that are needed acts as an impulse to distribute a certain amount of money with a certain amount of profit through radiating lines of endeavor. A reduction in the purchase of steel rail works back to the iron ore. A reduction in the amount of lumber purchased extends back not only to the forests but to the manufacturers who produce sawmill machinery and all the equipment necessary to maintain a sawmill in continuous operation.

The same conditions surround each purchase of the railroad, and the reduction of purchases by the carriers permeates the entire business world and affects, in a greater or less degree, the entire producing population of the country. I think you will agree, therefore, that while the members of the Railway Business Association, can be credited with instituting an investigation, they were acting in a matter which not only was of interest to the members of that association but is of interest to many million people.

It has been said that "there is no substitute for profits." No ingenuity in manufacturing, no scheme of advertising, no theory of "service" can be of any avail unless there is, in the end, a net profit to be retained in the treasury to be available for expenditure as profit in any one of the numerous channels through which money may be distributed.

Why, then, if such a great influence as the purchasing power of the railroads of the United States can be exerted in such a beneficial way toward the entire country, is it not of benefit to each producer, shipper, and receiver to see that the money placed at the disposal of the railroads is sufficient to create and maintain such a desirable thing as stability of purchases?

Speaking from the standpoint of a railroad official, after some years of experience in watching the fluctuations of traffic and the rise and fall of railroad revenues, I believe that no more beneficial thing could take place in the United States than the realization that a *prosperous* national railroad system is the best insurance against depression in business.

I have given you the decreases in net operating income for 1927 as compared with 1926 for some of the more important railroads of the United States, but the aggregate decrease for all railroads, giving credit for about 10 per cent of the mileage which shows an increase over 1926, was nearly $150,000,000.

Please bear in mind also that, forced to economize at every point, many of the railroads avoided an even worse showing by reducing expenditures for maintenance of way and maintenance of equipment. In many cases the decreased traffic justified reductions in both of these items. Nevertheless, the figures represent money that was not spent and which, for that reason, was not distributed among those who need it the most; namely, among those who depend upon their daily wage. Take for instance the maintenance of way, and bear in mind that some of these reductions are the result of utilizing machines which displace man power.

Reductions in maintenance of way expenditures for 1927 as compared with 1926 are on the next page.

Baltimore & Ohio	$1,745,265
Central of Georgia	931,973
Central of New Jersey	1,307,041
Chicago & North Western	1,059,945
Florida East Coast	1,000,374
Georgia Railroad	457,282
Illinois Central	3,152,737
Lehigh Valley	866,063
Michigan Central	1,183,264
Nickel Plate	374,368
Norfolk & Western	701,612
Pennsylvania	4,432,674
Reading	1,083,008
St. Louis-San Francisco	938,521
Seaboard Air Line	1,512,706
Southern Pacific	1,492,272
Southern	712,821
Virginian	675,300
Wabash	518,736
Wheeling & Lake Erie	739,518

These figures represent decreases in purchasing power of the individual employee, whether included in the railroad forces or in the forces of manufacturing establishments, and were further augmented by the decreases in the expenditure for maintenance of equipment, largely forced upon the carriers by decreased revenues, such as—

Atlantic Coast Line	$1,694,100
Baltimore & Ohio	3,721,259
Central of Georgia	564,167
Central of New Jersey	1,544,354
Chesapeake & Ohio	945,246
Chicago & Alton	1,281,970
Chicago & Eastern Illinois	1,268,217
Chicago & North Western	2,527,515
Chicago, Burlington & Quincy	3,644,984
Chicago Great Western	352,434
Chicago, Milwaukee & St. Paul	842,637
Chicago, Rock Island & Pacific	1,021,133
Cleveland, Cincinnati, Chicago & St. Louis	653,608
Delaware & Hudson	220,074
Delaware, Lackawanna & Western	1,706,469
Detroit & Mackinac	115,624
Elgin, Joliet & Eastern	269,685
Erie	1,564,532
Florida East Coast	1,385,832
Georgia Southern & Florida	164,561
Hocking Valley	611,151
Lehigh Valley	310,032
Louisville & Nashville	608,729
Michigan Central	1,345,652
Missouri-Kansas-Texas	804,094
Missouri Pacific	2,768,039
Mobile & Ohio	354,042
New York Central	4,589,753
Nickel Plate	580,779
New York, New Haven & Hartford	5,350,620
Pennsylvania	21,001,878
Pittsburgh & Lake Erie	731,354
Pittsburgh & West Virginia	263,649
Reading Company	762,394
St. Louis-San Francisco	839,699
St. Louis-Southwestern	721,719
Seaboard Air Line	603,875
Southern Railway	692,406
Union Pacific	616,781
Virginian	146,820
Wabash	576,134
Western Maryland	1,545,966

Some of these reductions, as compared with 1926, result from the fact that during the former year some roads had written off old equipment and did not find it necessary to repeat the process in 1927, but nevertheless, taking the figures as they stand, they represent largely reduced expenditures on the part of the carriers either in wages or material, and when we use the word "material" we mean the articles purchased from manufacturing concerns or the cross ties, lumber, and ballast purchased from the producers of those materials.

Please also bear in mind that the reduced expenditures for maintenance of way and maintenance of equipment do not mean reduced wage scales or, to any substantial extent, reduced prices of material, because the price of material in 1927 was practically the same as in 1926, while wage scales in 1927 were in many cases substantially higher than in 1926.

In quoting the figures showing decreases in maintaining equipment and roadway, I have not given all the items. Some railroads spent more in 1927 than in 1926, but on the whole there was a decrease in both expenditures for maintenance of roadway and also for maintenance of equipment, so that for the year 1927 the reduction in the total amount expended in the United States for wages and material in maintaining the equipment and roadway, as compared with 1926, probably amounted to $60,000,000.

I think the shipping public should consider whether the recession in business in the United States is not the result of the reduced purchasing power of the carriers because of inadequate revenues.

America stands almost alone in the problems which must be solved from the transportation standpoint. Practically every foreign country has a comparatively small area with an enormous mileage of ocean service provided by water carriers in distributing the products of those countries, and whereas in foreign countries the best customer of the home products is a foreigner located thousands of miles away, in America the best customer for American goods is the resident in America.

The liberality of spirit which the American public accords to private enterprises, to large manufacturing corporations, and to the development of hard-surfaced highways and the improvement of our inland waterways should in justice be accorded also to the rail carriers of the country, which have been so largely instrumental in bringing prosperity to practically everyone else but themselves.

But as stated by the Chairman of the Interstate Commerce Commission—"The struggle to do the same business at less cost is constantly going on," and he has indicated how the carriers "may achieve still further economies."

Instead, therefore, of getting relief through more lucrative rates and thus assisting in restoring and maintaining the prosperity of the Country, the railroads are told that reductions in expenses may be brought about by—

(a) The more efficient organization of equipment repair shops. This means more machinery and less men.

(b) Elimination of useless duplication of service. The difficulty of reducing what may appear to be duplicated service as between competing lines is that the local points are frequently deprived of reasonable service, and the taking off of trains means fewer engineers, firemen, and trainmen, with the smaller use of the engines and cars, which, of course, has the effect of reducing other forces.

(c) By abandoning unprofitable lines. As I have already said, many of the smaller lines cannot continue at the present rate of return which, of course, is based upon the rates of freight as applied to the available traffic, but the abandoning of a railroad line means discharging more men and less money circulating in the community.

(d) By avoiding unnecessary traffic solicitation. This idea was put into effect by the Railroad Administration under government operation with the result that many shippers were left entirely without expert advice from trained solicitors, and upon return of the railroads to private control the public generally welcomed the restoration of the traffic soliciting forces.

It must be remembered that we have now a national transportation system and that hardly any community is so isolated as to be independent of railroad contact, and merely from a selfish standpoint the prosperity of the railroads is a cause common to all and to the interest of every one of us.

I don't suppose that any one of you will deny the last statement, but your obligation goes further than mere acquiescence, because to insure prosperity to the railroads and through them to the country you must interest yourselves to see that railroad revenues are maintained through an adequate scale of freight rates.

Legal Aspects

And now in conclusion, a few references to the legal aspects, particularly as to remunerative rates.

For what a railroad does voluntarily, it must assume the responsibility, but when a public body undertakes to force upon a carrier unremunerative rates it becomes necessary to appeal to the courts. The Supreme Court has said—

> "The general principles to be applied are not open to controversy. The railroad property is private property devoted to a public use. As a corporation, the owner is subject to the obligations of its charter. As the holder of special franchises, it is subject to the conditions upon which they were granted. Aside from specific requirements of this sort, the common carrier must discharge the obligations which inhere in the nature of its business. It must supply facilities that are reasonably adequate; it must carry upon reasonable terms; and it must serve without unjust discrimination. These duties are properly called public duties, and the State may prescribe rules to insure fair remuneration and to prevent extortion, to secure substantial equality of treatment in like cases, and to promote safety, good order and convenience.
>
> "The public interest cannot be invoked as a justification for demands which pass the limits of reasonable protection and seek to impose upon the carrier and its property burdens that are not incident to its engagement."

In another case the Supreme Court said, with reference to transit privileges—

> "If the stopping for inspection and reloading is of some benefit to the shipper and involves some service by and expense to the railway company, we do not think that the latter is limited to the actual cost of that privilege. It is justified in receiving some compensation in addition thereto."

In distinguishing between actual expenses and out-of-pocket expenses, the Supreme Court has said—

> "* * * we entertain no doubt that, in determining the cost of the transportation of a particular commodity, all the outlays which pertain to it must be considered.
>
> "We find no basis for distinguishing in this respect between so-called 'out-of-pocket costs' or 'actual' expenses, and other outlays which are none the less actually made because they are applicable to all traffic, instead of being exclusively incurred in the traffic in question.
>
> "The State cannot estimate the cost of carrying coal by throwing the expense incident to the maintenance of the roadbed, and the general expenses, upon the carriage of wheat; or the cost of carrying wheat by throwing the burden of the upkeep of the property upon coal and other commodities.
>
> "This, of course, does not mean that all commodities are to be treated as carried at the same rate of expense. The outlays that exclusively pertain to a given class of traffic must be assigned to that class, and the other expenses must be fairly apportioned. It may be difficult to make such an apportionment, but when conclusions are based on cost the entire cost must be taken into account."

You have heard of the Hoch-Smith Resolution, and you know that the Interstate Commerce Commission is making a general investigation under Docket No. 17000.

Because of the above decision of the Supreme Court, which have been on record for over 13 years, I also call your attention to the testimony that has been given by the Interstate Commerce Commission members before the Senate Committee to the effect that the Hoch-Smith Resolution is a definite declaration by Congress that the rates of freight as to all traffic should be adjusted to "what the traffic will bear."

In my own interpretation of the Interstate Commerce Law and of the Hoch-Smith Resolution, I have reached the conclusion that the law of the land requires the public authorities to adjust the rates to what the traffic will reasonably bear, because I do not believe in extracting the last cent of profit, and from the standpoint of the carriers to adjust rates which will insure fair remuneration to the individual railroad as well as to the railroads of the United States as a whole.

I believe that if this interpretation is carried into effect, we shall have instead of a fluctuating and spasmodic prosperity a steadily prosperous condition to all concerned. Under such a policy, the phrase "traffic development" will be something more than an academic idea.

Parker Introduces New Motor Transport Bill

REPRESENTATIVE Parker has introduced a new bill, H. R. 12380, in Congress providing for the regulation of interstate passenger motor vehicles operating as common carriers. The new bill represents a compromise agreement arrived at by representatives of the American Railway Association, the American Electrical Railway Association, the state public service commissions and the Bus Division of the American Automobile Association. The measure in general, it is believed, will have the support of these organizations, although there may be some individual reservations. This bill is much less drastic than the previous one introduced by Representative Parker, H. R. 5640, which included also the regulation of interstate motor truck transportation.

The bill provides for administration by local public service commissions of the various states, or by joint boards made from the commissions of two or more states. Within 60 days after this bill becomes a law the state commissions authorized to act under it are required to file notice of their intention to do so with the Interstate Commerce Commission. In the absence of such notifications from a state, the Interstate Commerce Commission itself will administer the provisions of the law as it applies to that state.

The primary regulatory requirement of the proposed law is that a certificate of public convenience and necessity must be secured either from the state commission, a joint board, or from the Interstate Commerce Commission (whichever may have jurisdiction) for any interstate highway common carrier operation. The bill provides that carriers in bona fide operation at the time the law becomes effective shall have 90 days thereafter in which to file applications for certificates and shall have the right to continue in operation until these applications have been finally disposed of. It is also provided that the fact that an applicant for a certificate was in bona fide operation at least one year prior to the opening date of the legislative stssion at which thisb ill is passed and thence until the time of applicaton shall be considered prima facie evidence as to public convenience and necessity. Applications for certificates are to specify the following under oath: The name and address of the applicant and addresses of officers or co-partners; highways and routes over which it is proposed to operate; a description of the vehicle or vehicles to be used; a statement of assets and liabilities; any other information required by the authority receiving the application. In the case of a state which has no public service commission or the commission of which does not file notice of intention to act under the provision of the proposed law, original applications will be made direct to the Interstate Commerce Commission. Upon the filing of an application a joint board or commission, as the case may be, must fix a date for a public hearing, which, 90 days after the effective date of the proposed law, must be not less than 20 or more than 90 days after the filing of the application. In determining public convenience and necessity, the regulatory authority must give reasonable consideration, among other things, to existing transportation agencies and service.

The regulatory authority in issuing a certificate to a motor coach operator may authorize a route in whole or in part and may attach reasonable restrictions, conditions and regulations, specifying routes. Certificates will be effective from the date issued and will continue until suspended or revoked. Transfers may be made only by the approval of the authority upon the joint petition of the tranferer and transferee. Carriers

are to file bonds or insurance policies payable to the United States, to bind them to any final judgment rendered on account of death or injury to passengers or others or damage of property due to negligence. The regulatory authority may exempt a carrier from this requirement if it can show due assurance of its ability to pay any such claims, upon its agreement to report promptly all accidents in connection with the operation of its motor vehicles. Exemption from the filing of such bond or insurance is revokable on ten days notice.

It is provided that rates, fares and charges shall be just and reasonable and in accordance with tariffs filed and posted in a manner to be prescribed by the Interstate Commerce Commission. The tariffs must be rigidly adhered to and free passes are to be issued only under the restrictions now operating with regard to railroad passes. No change in tariffs may be made except after 30 days notice unless especially authorized by the regulatory authority. Any person or organization is permitted to complain against unjust or unreasonable rates, and such charges must be investigated by the regulatory authority. The Interstate Commerce Commission is directed to promulgate a uniform system of accounting for motor carriers and to require reasonably continuous and adequate service at just and reasonable rates.

In case of any controversy or question in carrying out the provisions of the proposed law, the board sitting in the case, upon application of any party must certify a copy of the hearing to the Interstate Commerce Commission. Decisions of joint boards are to be made by a representative of each component party voting as a unit.

Any party in a case decided by any local commission or joint board who may be dissatisfied with the decision is privileged to appeal to the Interstate Commerce Commission within 30 days, the latter to have jurisdiction and finally determine the case at issue. The I. C. C. hearing is to be on the record made before the board of original jurisdiction. To introduce new evidence, the dissatisfied party is to have the right of appeal to the board rendering the original decision for a rehearing and, if this is granted, to introduce new evidence. When an appeal is taken to the Interstate Commerce Commission, the latter will have the power to suspend the original decision pending appeal. If any state or joint board fails to render a decision within 90 days following the submission of any matter before it, any party to the proceeding will have the right to carry the case to the Interstate Commerce Commission, in which case the I. C. C. may reopen the case for further hearing if it deems such action necessary.

Penalty for knowingly refusing to comply with the order of an authority constituted in the proposed act is fixed at $100 for each offence, each day of violation constituting a separate offence. Operation of motor vehicles in wilful violation of the proposed law carries a fine of $100 for the first offence and $500 for any subsequent offence. Provision is made for application to any court of competent jurisdiction by any regulatory board or injured party for a writ of injunction or for other proper process to enjoin obedience to the proposed law. Expenses for administration of the act are to be provided by a separate contingency fund to be put apart from the treasury of the United States. The bill specifically provides that nothing in it may be construed to authorize any intrastate operation or to interfere in any way with the exclusive authority of each state in the regulation of such transportation. A further clause provides that if any provision of this act shall be held unconstitutional either as respects motor carriers or any motor carrier or class of motor carriers, such invalidity shall not be held to affect any other provision thereof.

Looking Backward

Fifty Years Ago

The management of the Pittsburgh, Cincinnati & St. Louis [now part of the Pennsylvania] has issued an order discontinuing all Sunday freight trains, except such as carry livestock or perishable matter.—*Railway Age,* March 28, 1878.

A system of preserving railway ties, used in England, is said to increase the life of the ties to 20 or 30 years. The day is not far distant when the increased cost of timber in this country will make the general use of some method of preserving wood profitable, unless the use of metal for cross ties comes into vogue.—*Railway Age,* March 28, 1878.

The boiler of the largest freight engine ever built on the Boston & Albany is now in the erecting shop at Springfield, Mass. The total area of heating surface is 555 sq. ft. and the cylinders are 18¾ by 28 in. The weight of the monster will be about 40 tons, and the average train say 25 loaded cars.—*Chicago Railway Review,* March 30, 1878.

At least one or more of the general officers of nearly 40 of the principal western railways met at Chicago on March 26 to agree upon the percentages of east-bound business which the different roads should receive under the apportionment scheme agreed upon in New York. Division of traffic was made for Chicago, Indianapolis, St. Louis, Cincinnati, Louisville and Peoria. East-bound from Chicago the percentages were divided as follows: Michigan Central, 32; Lake Shore & Michigan Southern, 27; Pittsburgh, Ft. Wayne & Chicago, 24; Pittsburgh, Cincinnati & St. Louis, 7; Baltimore & Ohio, 10.—*Railway Age,* March 28, 1878.

Twenty-Five Years Ago

George J. Ray has been appointed division engineer of the Delaware, Lackawanna & Western, with office at Scranton, Pa.—*Railway and Engineering Review,* March 28, 1903.

Under the new anti-trust law of Texas, passed by the legislature and signed on April 1 by the governor, labor unions are included among trusts, combinations and monopolies which are prohibited.—*Railway Age,* April 3, 1903.

The "Pennsylvania Special" 20-hour train between New York and Chicago, which was taken off on February 5 in consequence of the freight congestion, is to be restored on May 3.—*Railroad Gazette,* April 3, 1903.

The Baltimore & Ohio has obtained 50,000 sq. ft. of space in the Transportation building at the Louisiana Purchase Exposition at St. Louis and will make an extensive exhibit showing the evolution and development of the world's railways.—*Railway Age,* April 3, 1903.

Ten Years Ago

The railroad control bill was signed by President Wilson on March 21, immediately after the passage of the war finance corporation bill by the House. The President held the bill for a week because if there had been a failure of the finance corporation bill, which provides for loans to railroads, it would have been necessary to seek a larger appropriation than the $500,000,000 provided in the railroad bill.—*Railway Age,* March 29, 1918.

"We are building over here to fight a thirty-year war, if necessary, in order to establish the principles of democracy," W. W. Atterbury, director general of transportation of the Army in France and in private life vice-president of the Pennsylvania, told a New York newspaper correspondent at Paris, France, on March 26. "Our task is to make two lines of railroad from the sea to the bases at the front, wherever this front may be. Before the end of 1918 we will have not less than 800 miles of railroad constructed.—*Railway Age,* March 29, 1918.

Communications and Books

Some Suggestions for Locomotive Improvement

NEW YORK.

TO THE EDITOR:

I was very much interested in the editorial on Why Locomotive Auxiliary, and C. A. Brandt's paper on The Design and Proportion of Locomotive Boilers, presented before the February meeting of the Canadian Railway Club, both of which appear in your March 10 issue.

The steam locomotive is a pressure-heat machine and its overall efficiency is a combination of boiler, engine (including feed water heating) and machine efficiency. Electric current generating and motor equipment has already been developed to a pretty high state of efficiency, and there is not much left in the way of possibility to produce the maximum efficiency obtainable, but the steam locomotive has many possibilities in that direction.

The splendid achievements of physical and chemical engineering, in combination with improvement in design, make it possible for us now to take advantage of higher steam pressures and temperatures and enable more heat units to be compressed into a smaller volume. When a pound of steam at the higher initial pressure and temperature is expanded to the same exhaust pressure as a pound of steam at lower initial pressure and temperature, the former will, through an increased number of expansions, convert a greater amount of energy into work.

Overall efficiency in the steam locomotive, from the coal to the drawbar pull, now ranges from 6 to 9 per cent, and what we need and must have in future new steam motive power—which, in order to justify the investment cost, should remain with us and be useful for the next 35 to 50 years—is the utilization of a much greater percentage of the heat value of the fuel in the combustion process and in the live steam. This means higher pressure boilers; improved means of combustion; better circulation of the boiler water with better absorption of the products of combustion; increased pressure and temperature of the steam entering the cylinders at short cut-off; less heat exchange loss or cooling of the steam entering the cylinders by exhaust-swept clearance spaces and cylinder and piston walls; and reduced pressure and temperature of the exhaust steam. In order to accomplish this, we must reduce, instead of increase, the obstructions in smokeboxes, and reduce the temperature, resistance and heat losses of the gases flowing through the boiler and smokebox.

Thermo-dynamically, superheated steam is much more sensitive to heat losses than saturated steam, and where there is a high initial superheat there is a certain amount of superheat left in the exhaust. However, cylinder condensation is the main source of heat loss and we must make a radical change in the conventional cylinder and valve design to overcome it. This can, no doubt, be accomplished by a modified arrangement of unaflow cylinders, as the loss resulting from limited cut-off with counterflow cylinders is responsible for a large amount of inefficiency.

There is now too much frictional resistance and loss of pressure between the boiler and the cylinders caused by the tortuous passages that the steam must take to get between these two points. Furthermore, our present practice of passing the superheated steam through the coldest part of the boiler on its final passage to the cylinders is a most undesirable practice. By making use of a firebox-fire-flue type of superheater in combination with exterior saturation and superheated steam conduits and a throttle valve located outside of the boiler, much more steam space will be provided inside of the boiler and there would be much greater accessibility to all of these parts. Likewise, we will secure the benefit of more radiant heat effect in the superheating process; there will be less restriction of the gas areas through the flues and tubes; the gas area through the superheater elements can readily be increased with corresponding reduction in frictional and pressure losses. Furthermore, the removal of the superheater header, the steam branch pipes and the baffle, diaphragm, deflector and other plates from the smokebox will enable keeping the flues and tubes clean, will reduce the exhaust pressure and enable lowering the smokebox temperature. In other words, we must follow in locomotive practice the inter-deck and furnace types of superheater arrangements which are now being utilized in practically all central power station, high-pressure, high-temperature, high-capacity boiler installations.

Waste heat in the exhausted steam from the main engines and accessories and in the smokebox gases must also be utilized by all possible reclamation in the boiler foodwater.

J. E. MUHLFELD.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

50 Jahre 1878-1927 Archiv fur Eisenbahnwesen. Dated January-February 1928 this half-century anniversary number includes a review of 50 years by Dr. von der Leyen, statistics of the world's railways for 1925, and important articles on railways in Asiatic Russia, English railways since 1921, Canadrian railway systems and discussions of railway conditions in other sections of the world. 340 p. Pub. by Julius Springer, Berlin, Germany. 10 RM.

Government and Business—a Study in the Economic Aspects of Government and the Public Aspects of Business, by Earl W. Crecraft. Chapter 19 "Transportation and Government" and the portions of Chapter 14 on employee and stockholder representation and Chapter 18 on international transport and communication policies will be of particular interest. 508 p. Pub. by World Book Co., New York. $2.96.

Principles of Rate Making, by Joseph H. Donnell, Traffic Management Manual No. 52 outlining principles involved in the construction of freight rates. The general level of rates, cost of service, value of service, volume and regularity of movement and various kinds of competition are considered. 72 p. Pub. by LaSalle Extension University, Chicago. $1.

Periodical Articles

After Eight Years, by Franklin Snow. What has happened or apparently happened since the Transportation Act, 1920, became effective. North American Review, April 1928, p. 452-460.

Une Exploitation Industrielle de la Forêt Equatoriale, by Léon Géraud. The great railway systems of France formed the "Consortium Forestier des Grand Réseaux" in 1920 to operate a forest concession in Gabon and thereby assure themselves of ties, timber and wood for various purposes. The organization of the consortium, problems of feeding, housing and otherwise caring for employes, getting equipment in and wood out, the tropical woods and their uses in railway service are presented in an interesting way. Americans will have to become accustomed to "A. E. F." meaning "Afrique Equatoriale Française." Revue Générale des Chemins de Fer, March 1928, p. 181-197.

Use of Cost-of-Living Figures in Wage Adjustments, by Ethelbert Stewart. The Bureau of Labor Statistics' indexes as used in railroad arbitrations and others with opinions as to their value. Monthly Labor Review, March 1928, p. 1-8.

Odds and Ends of Railroading

Oldest Pensioner?

The Missouri Pacific probably enjoys the unique distinction of having the oldest ex-railroad employee, who, after a period of service extending over forty-four years, was retired on a pension May 1, 1918, and is still living at the exceedingly ripe old age of nearly 104 years. M. Judsonia is the name of this old veteran, who is a colored man and now resides in a little place just beyond the town of Bald Knob, Ark. He was born in slavery in North Carolina on April 11, 1824, and at the close of the Civil War went to Arkansas where in 1874, when already 50 years old, he was employed on a construction gang engaged in building the Cairo & Fulton, which later became an important section of the present Missouri Pacific Lines. He served on track work for many years and, during the latter years of his service was employed as a helper at the Bald Knob station, where he continued until retired on pension at the age of 94.

You Can't Get Around the Judges

WASHINGTON, D. C.

TO THE EDITOR OF ODDS AND ENDS:

As is well known to every one who follows the doings of Congress, the average Congressman, when one of his pet laws gets knocked out by a decision of a court, at once proceeds to secure the passage of a new law, taking the place of the one that has been killed; or, in other words, he casts about to see how he can, by means of pure camouflage, present for the criticism of the judges, a different set of facts or statements, while still cherishing his original purpose. A court decision recently reported, in a case where a railroad appealed from a verdict of excessive damages, amusingly illustrates how jurymen are a good deal like Congressmen in this respect.

The case was tried and the jury gave damages of $750. This decision against the road was reversed, in the higher court, solely for the reason that the sum was excessive. The case was retried and the result was a verdict for $1,000, for which sum judgment was entered. But the railroad again appealed. There was no substantial difference in the evidence in the two trials and this decision also was reversed. (C. & O. vs. Hill, 299 S.W. 1059). The court simply said that the evidence was the same as before and "the law of the case" was that the verdict was excessive. In other words, the higher court was obliged plainly to tell the lower court to go back and read the first reversal. B. R. B.

For Musicians Only

Allison W. Ind writes to compliment this department in such terms that our modesty forbids repeating them. Then he says:

"I have noticed at times some gossip about a 'railroad symphony.' Now it's a pretty sure bet that when Edward Greig, the great composer of Peer Gynt Suite, Op. 46, wrote Part Four of the suite 'In the Hall of the Mountain King,' he did not have in mind the poetry and music of some great brute of a locomotive laboring to tug a sullen string of heavy Pullmans into motion. But it seems to us that here he created a 'railroad symphony' of unsurpassed beauty and expression. Listen to it once.

"Can't you hear the first slow, deliberate explosions from a short, stubby stack, and see the rigid blast of smoke climb straight and high? Then she begins to feel the rail. The exhausts become faster. There is a ponderous, rhythmical clank as side and main rods alternately thrust and pull on the pins. Faster . . . Faster . . . The increasing drone of flashing drivers. The quickening beat of oscillating crosshead—like the sweep of a baton. The perfect syncopation of valve gear. Faster . . . Faster . . . New sounds join the symphony. Woodblocks clicking as wheels meet joints. Sharp tongued squeals from between swaying tender and thumping engine. Faster . . . Faster . . . The click of blocks becomes the con-rattle of snares, punctured with an irregular one-toned thud of axles taking up the end play. The soprano song of the wind shrilling out above the hoarse bellow of the exhaust. Faster . . . Faster . . . Until all is blended into one mighty chorus of rushing sound . . . Confused . . . Yet thundering with measured accent. . . .

"It's all there; and more! Try it."

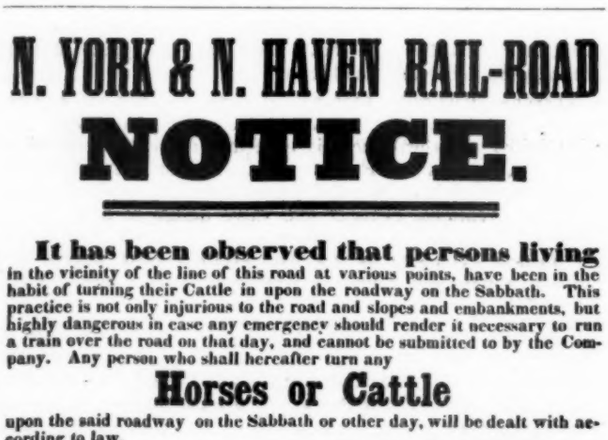
12 M.P.H. Speed-Limit for "Devil-Wagons"

Technical editors fifty years ago found it worth while to face the mechanical age with an open mind. Witness this item from the *Railway Age* in 1870:

"It is hardly safe to be skeptical nowadays in regard to the announcement of any invention pertaining to railway operation, no matter how novel and startling. Still we would really like to see in operation the latest French idea—that of reflecting a hundred miles of road by mirrors, to a great mirror at a central station, so that the movements of all trains can be seen at once—before we grow enthusiastic."

But on the other hand probably the editor who wrote the following would have viewed with horror the suggestion that railroads would 25 years later be operating the "devil-wagon" as an adjunct to their trains:

"Automobile accidents have become so alarmingly frequent that the new conveyance will soon have to be abated, as a public nuisance, unless speeding can absolutely and everywhere be prohibited.* * * * City and village ordinances limiting the speed of automobiles to 8 or even 12 miles an hour are contemptuously evaded by the drivers of machines that can run 40 or 50 miles an hour, and the possibility of occasional arrest at the cost of a $5 fine, will never prevent speeding up to the limit at every opportunity. The only way to stop this dangerous sport is to stop the construction of motor carriages capable of making a speed of more than, say, 12 miles an hour. * * * If automaniacs want to build roads to be devoted solely to their sport, with ample protection of crossings, the construction of high-speed machines for use exclusively on such courses might be permitted. But this would need to be under condition that the detection of such a "devil-wagon" upon any other road or street would mean its confiscation, and in extreme cases, the electrocution of the murderous driver."


N. YORK & N. HAVEN RAIL-ROAD
NOTICE.
It has been observed that persons living in the vicinity of the line of this road at various points, have been in the habit of turning their Cattle in upon the roadway on the Sabbath. This practice is not only injurious to the road and slopes and embankments, but highly dangerous in case any emergency should render it necessary to run a train over the road on that day, and cannot be submitted to by the Company. Any person who shall hereafter turn any
Horses or Cattle
upon the said roadway on the Sabbath or other day, will be dealt with according to law.
R. B. MASON,
Superintendent of New-York and New-Haven Railroad.
Bridgeport, August 1st, 1850.

Safety Ideas Are Not Entirely New, As Indicated by the New Haven's Warning Proclamation Issued 78 Years Ago

NEWS *of the* WEEK

Gilt Edge Express on N. Y., N. H. & H., at Dedham, Mass.

THE AMERICAN RAILWAY DEVELOPMENT ASSOCIATION will hold its annual meeting at Miami, Fla., on May 9, 10 and 11.

THE PROTECTIVE SECTION of the American Railway Association will hold its annual meeting at Hotel Statler, St. Louis, Mo., on June 19, 20 and 21.

THE NEW YORK CENTRAL, on March 19, placed in service its new $2,000,000 locomotive terminal at Harmon, N. Y. Harmon is the point where the change is made between steam and electric traction for the New York terminal zones.

THE SOUTHERN PACIFIC announces that, beginning with April 1, the locomotive whistle signal to be sounded at the approach to grade crossings will consist of one long blast, two short ones and a final long one.

THE TERMINAL FACILITIES, freight stations and the mechanical department forces, of the Denver & Rio Grande Western and the Missouri Pacific, at Pueblo, Colo., will be consolidated and operated jointly beginning April 1.

THE ST. LOUIS RAILWAY CLUB will hold its next meeting on April 13, when a paper will be read on "The Railroad Situation Today" by Col. Fred W. Green, vice-president, St. Louis Southwestern. The annual election of officers will take place at this meeting.

EMPLOYEES OF the Denver (Colo.) shops have just celebated the completion of a period of nine months, from June 16, 1927, to March 16, 1928, without a reportable personal injury. At the ceremonies a flag was presente to the employees by J. A. Carney, superintendent of safety.

THE INTERSTATE COMMERCE COMMISSION on March 27 issued its tentative valuation report on the Western Union Telegraph Company finding the final value for rate-making purposes of the company's property located in the United States as of June 30, 1919, owned and used, to be $84,744,565.

THE HEARING on the complaint filed by the Brotherhood of Locomotive Engineers and the Brotherhood of Locomotive Firemen and Enginemen, asking the interstate Commerce Commission to require the railroads to equip their locomotives with mechanical firebox doors, has been assigned for May 2 at Washington before Special Examiner Rogers.

A SAVINGS BANK in the state of New York may invest its surplus in bonds and obligations of railroad corporations; but, under a new law, Chapter 449, of the laws of 1928, may not invest more than two per cent of its surplus in any one particular issue; which two per cent must not exceed in value 10 per cent of all of the stock or obligations of the railroad.

REPRESENTATIVE MERRITT, of Connecticut, has introduced in Congress a bill, H. R. 12,177, to amend and re-enact subdivision *a* of Section 209 of the transportation act, to enable the Merchants' & Miners' Transportation Company and any other independent water carrier similarly situated to prosecute claims for a guaranty for the six months following the federal control period in 1920. A similar bill was introduced in the Senate by Senator Bruce, of Maryland.

THE SOUTHERN PACIFIC suffered about $300,000 damage to its Los Angeles-Montalvo line along the Santa Clara river from the St. Francis dam flood on March 12. About 20 miles of track was washed out by the flood. Numerous wooden trestles and a 500-ft. steel bridge were washed out.

W. F. LAGRONE, of West Point, Miss., a member of the Mississippi Railroad Commission, died of heart disease on March 18 while sitting in the lobby of a hotel at Tupelo, Miss.

Investigate Legal Side of Express Situation

A committee to inquire into the legal aspects of the future conduct of the railroad express business, in view of the approaching termination of the existing uniform contract with the American Railway Express Company, has been appointed with the following membership: R. J. Cary, vice president and general counsel, New York Central (chairman); C. B. Heiserman, vice-president and general counsel, Pennsylvania; H. W. Clark, general counsel, Union Pacific; M. L. Bell, vice-president and general counsel, Chicago, Rock Island & Pacific; and F. C. Nicodemus, Jr.

This committee will report to the Mail and Express Committee of the Association of Railway Executives.

Transportation Division, A. R. A., To Meet in St. Louis

The regular annual session of the Transportation Division of the American Railway Association will be held at the Hotel Chase, St. Louis, Mo., at 10 a. m., April 26, according to an announcement by G. W. Covert, secretary. At this session the Division will consider and take action upon the reports of the General committee and the committees on Car Service, Records, Demurrage, Storage, Reconsignment and Diversion, Freight Handling Service and Railroad Business Mail.

Railways Oppose Steel Car Bill

Mail traffic and other officers of various railways testified at a hearing before the Senate committee on postoffices and post roads on March 26 in opposition to the bill, S. 2107, which provides that after January, 1930, all cars used for railway postoffice service shall be of steel construction and conform to specifications required by the Postmaster General. The bill contains a proviso that after that date no apartment railway postoffice car of other than steel or steel underframed construction may be operated by any independent short-line railroad in trains in which steel or steel underframed cars are operated. H. E. Mack, manager of mail and express traffic, Missouri Pacific, stated that in the mail cars which the bill would make unlawful there has not been a fatality since 1921.

Loring Sets Up $100,000 Fund for B. & M. Employees

Homer Loring, who has just retired as chairman of the Boston & Maine, accepted no compensation fom the railroad during the four years in which he directed the work of the railroad's rehabilitation. Upon his retirement the board of directors voted him the sum of $100,000 which Mr. Loring accepted only in order

to establish a fund "to be administered by trustees for the general good of all employees" of the Boston & Maine.

Mr. Loring in his letter to the board said: "As I think most of you know, I did not enter Boston & Maine affairs with any idea of financial remuneration. The task seemed worth undertaking and the satisfaction and enjoyment in having helped accomplish it, has been adequate compensation for what I have contributed.

"The new Boston & Maine has been created by the courage and judgment of the entire board of directors and by the loyal efforts of the whole body of employees. So I am going to accept with sincere thanks your gift of $100,000 and establish with it a 'Boston & Maine Employees Fund' the income to be administered by trustees for the general good of all the employees".

The detailed plan for administering this "Boston & Maine Employees Fund" will be worked out by the trustees, selection of whom will be made later.

Atlantic City Exhibit Space 90 Per Cent Taken

At a meeting of the Exhibit Committee of the Railway Supply Manufacturers' Association held at Pittsburgh, Pa., March 22 and 23, assignments of 127,000 sq. ft. of exhibit space were made to 321 exhibitors for the exhibit which will be held on Young's Million Dollar Pier at Atlantic City, N. J., June 20 to 27, inclusive, during the conventions of the Mechanical, Purchases and Stores, and Motor Transport Divisions of the American Railway Association. The total space available this year is 142,270 sq. ft., of which 48,000 sq. ft. is located in Marine Hall, the new structure which is being provided on the ocean side of the boardwalk immediately adjoining and directly connected to the boardwalk end of the pier.

The Mechanical Division meeting will be held from June 20 to 27, inclusive, in the convention hall on Young's Million Dollar Pier; the Purchases and Stores Division will meet in Vernon Hall, Haddon Hall Hotel, June 20 to 22, inclusive, and the Motor Transport Division meeting will be held at the Traymore Hotel, June 21 to 23, inclusive.

Verdict Based on "Imagination and Sympathy" Reversed

In an action under the Federal Employers' Liability Act for the unexplained death of a car inspector whose body was found between the main track and a parallel track on which a freight train was being made up, the Texas Supreme Court sustained a verdict for the plaintiff on plaintiff's hypothesis (supported by little if anything except the place where the body and the lantern of the deceased were found) that he had been engaged in inspecting the cars and so absorbed that he did not hear an approaching train on the main track, relying on the usual ringing of the engine bell, which witnesses said was not rung.

The Supreme Court of the United States has reversed this judgment, on the ground that it was a mere guess that the deceased was engaged in inspection work at the time of his death; still more that he was absorbed therein. The deceased was seen not later than 6:45 p. m. The train passed at its schedule time, known to him, 7:05. His body was found at 7:25. The main track was straight and the train was making a great noise and showing a bright light as it approached. Nothing, it was held, except imagination and sympathy warranted a finding that the death was due to the negligence of the railroad rather than to that of deceased himself. Kansas City Southern vs. Jones. Decided March 19. Opinion by Mr. Justice Holmes.

New York Legislature Adjourns

The New York State Legislature has adjourned after almost the shortest session on record. It passed a number of laws of interest to railroads which are now in the hands of the governor, who has 30 days in which to take action on them.

Two measures, introduced by Senator Thayer, provide that, subject to the approval of the Public Service Commission (or the Transit Commission) every city, town and village has the right to grant operating permits to motor vehicle lines and street railways, and there is a provision providing for agreements to purchase, which look to the approval ultimately of municipal ownership and operation of transit facilities.

The Westall bill aims to throw upon the state, county or city, a part of the cost of installing automatic electric signals at highway crossings. Under present conditions, the entire expense of such installations has generally been borne by the railroad company.

The laws of the state providing for the elimination of highway grade crossings, which are embraced in a number of different acts, have been made uniform as to language. The legislature appropriated, for grade crossing elimination (outside of the city of New York) in 1928, the sum of $40,000,000.

The governor also has a number of bills amending the tax laws which may affect railroads and motor coach lines.

Of the four laws relating to the elimination of grade crossings, three were signed by the governor on March 28, and the fourth, relating wholly to the city of Syracuse, is expected to be signed shortly.

These four laws, one dealing with the state at large and the other three with Buffalo, Syracuse and New York City, are the old laws redrafted and they are now uniform in terms. The most notable change, from the railroad standpoint, is that under which the state is to pay 40 per cent of the cost in each case and the county 10 per cent, leaving no specific burden on the town or city. This, however, is not true as regards New York, Buffalo and Syracuse; in the three cities named, the charge will be 10 per cent against the city. The cities of Syracuse and Buffalo will also bear their proportionate share of charges against the counties of Onondaga and Erie, respectively, for crossing charges outside these cities. The railroads in all cases pay 50 per cent, as now. The new laws are numbered 677 for New York City, 678 for crossings outside of the three cities and 679 for the Buffalo law. Chapter 632, also signed by the governor on Wednesday, authorizes the appropriation of forty million dollars for work outside New York City.

Hearing on Rules for Car Hire Settlement

Final hearings in connection with the Interstate Commerce Commission's investigation of the rules for car-hire settlement, which has been under way for over a year and has been the subject of hearings held throughout the country, were begun this week at Washington before Director W. P. Bartel of the commission's Bureau of Service. The investigation was instituted following complaint filed by the American Short Line Railroad Association taking the position that the code of per diem rules of the American Railway Association is inequitable as between subscribers and non-subscribers to the car service and per diem rules agreement.

The short line association, on behalf of many of its members, takes the position that Per Diem Rule 6, to the extent that it is enforced, deprives a subscriber and a non-subscriber of the right to agree between themselves as to how they will share the cost of car-hire. It asks that paragraph (b) of the rule be cancelled and that a rule be provided under which a reclaim or free time for short lines will be sanctioned whenever the short haul or low revenue accruing to the short line or other local circumstance justifies it or that connecting lines be left free to agree with non-subscriber roads on free time or a reclaim whenever the circumstances justify it. The short lines also contend that short line car owners, whether subscribers or not, are entitled to just as much compensation for the use of cars they own as is paid to subscriber owners, whereas some roads compensate short lines for the use of their cars only on a mileage basis.

The hearings were begun in Washington last March and during the past year hearings have been held at Boston, Pittsburgh, Kansas City, Ogden, Seattle, Portland, San Francisco, Houston, New Orleans, and Atlanta, at which a large number of short line witnesses have been heard.

At the Washington hearing additional testimony was given by officers of short lines and L. S. Cass, vice-president of the short line association, gave a general summary of the position of the short lines, while Ireland Hampton, a statistical witness for the short lines, presented an exhibit to show that short lines are operating at an economic disadvantage and that while an individual readjustment of their divisions or general rate increases would require a protracted procedure, a revision of the car service rules for their benefit could be promptly effected. This was to be followed by testimony of representatives of the A. R. A. and of individual roads.

Traffic

The Interstate Commerce Commission has assigned its proceeding of investigation relating to constructive and off-track railroad freight stations on Manhattan Island, N. Y., for hearing May 16 before Examiner Harry C. Ames.

Packing Furniture for Shipment

The Freight Container Bureau, Edward Dahill, chief engineer, 30 Vesey street, New York City, has issued a series of bulletins giving information on the packing of furniture; several pages of drawings showing, in great detail, the proper construction of crates, with instructions concerning loading and unloading.

Traffic Club of Chicago

The Traffic Club of Chicago held its annual meeting on March 27. The officers chosen for the ensuing year are: President, M. H. Kennelly, (Warner Brothers Storage Company); first vice president, A. R. Gould, (C. & N. W.); second vice president, C. T. Bradford, (int'l. Harvester Company); third vice president, H. R. Kurrie (C. I. & L.); secretary, H. E. MacNiven, (N. Y. Life Ins. Co.,); treasurer, J. H. Howard, (C. M. St. P. & P.).

Freight Commodity Statistics Issued

The Interstate Commerce Commission has issued the comparison below, by general groups of commodities, of the tonnage transported during the third quarter in 1927, with the corresponding period in 1926, also a comparison of the cumulative figures for the periods January 1 to December 31, 1927 and 1926.

Groups of Commodities	Number of tons originated: Quarter ended Dec. 31, 1927	Quarter ended Dec. 31, 1926	Per cent of increase or decrease
Products of agriculture	37,505,141	36,896,767	↑ 1.65
Animals and products	7,217,219	7,359,277	↓ 1.93
Products of mines	168,544,153	211,562,242	↓20.33
Products of forests	22,907,46↑	24,434,284	↓ 6.25
Manufactures and miscellaneous	66,809,139	70,392,190	↓ 5.09
All L.C.L. freight	9,554,932	10,001,859	↓ 4.47
Total	312,538,048	360,646,619	↓13.34
	Total tons carried		
Products of agriculture	68,813,171	68,860,739	↓ 0.07
Animals and products	12,796,254	12,860,604	↓ 0.50
Products of mines	302,698,212	375,325,101	↓19.35
Products of forests	43,426,633	47,797,717	↓ 9.14
Manufactures and miscellaneous	129,889,125	138,348,933	↓ 6.11
All L.C.L. freight	16,300,224	17,557,542	↓ 7.16
Total	573,923,619	660,750,636	↓13.14
	Number of tons originated: Twelve months ended Dec. 31, 1927	Twelve months ended Dec. 31, 1926	Per cent of increase or decrease
Products of agriculture	113,374,973	111,787,179	↑ 1.42
Animals and products	26,009,178	26,244,068	↓ 0.90
Products of mines	714,108,110	758,064,458	↓ 5.80
Products of forests	99,390,522	104,858,549	↓ 5.21
Manufactures and miscellaneous	291,087,161	296,075,910	↓ 1.68
All L.C.L. freight	38,432,031	39,497,628	↓ 2.70
Total	1,282,401,975	1,336,527,792	↓ 4.05
	Total tons carried		
Products of agriculture	219,709,170	222,428,819	↓ 1.22
Animals and products	46,452,255	46,824,330	↓ 0.79
Products of mines	1,269,034,968	1,338,093,897	↓ 5.16
Products of forests	189,881,453	201,670,174	↓ 5.85
Manufactures and miscellaneous	560,837,333	575,472,495	↓ 2.54
All L.C.L. freight	65,158,084	68,296,686	↓ 4.60
Total	2,351,073,263	2,452,786,401	↓ 4.15

↓ Decrease. ↑ Increase.

Freight Traffic in January

Freight traffic transported by the Class I railroads in January amounted to 36,271,193,000 net ton-miles, according to reports compiled by the Bureau of Railway Economics. Compared with January, 1927, this was a decrease of 2,961,323,000 net ton-miles or 7.5 per cent, and a decrease of 3.7 per cent, under the total for January, 1926.

In the Eastern district there was a decrease of 12.6 per cent compared with the same month of 1927, and in the Southern district 8.8 per cent. The Western district, however, reported an increase of 0.8 per cent.

The average daily movement per freight car in January was 27.6 miles, a decrease of 0.9 miles under the same month last year, but the same as that for January, 1926. The average load per freight car in January, 1928, was 27.2 tons, including l.c.l. freight; a decrease of 1.2 tons under January, 1927, and of 0.4 ton under January, 1926.

Business Men Seek Electrification —Say Commuters Will Pay

Chambers of Commerce and other organizations of local business men of Newark and a number of smaller communities in the metropolitan suburban territory of Northern New Jersey served by the Delaware, Lackawanna & Western, on March 27 petitioned the president of the road, J. M. Davis, for electrification of suburban lines serving these municipalities. As an incentive they stated that perhaps commuters would be willing to consent to an increase of 15 per cent in their rates as a contribution toward the improvement. President Davis stated he would study the petition, and give his answer later.

Equipment and Supplies

Locomotives

THE CANADIAN NATIONAL has ordered 12 snow plows from the Eastern Car Company.

Freight Cars

THE NORFOLK & WESTERN will rebuild 250 all-steel 90-ton gondola coal cars at its Roanoke shop.

THE PACIFIC FRUIT EXPRESS is inquiring for from 450 to 800 steel underframes for refrigerator cars.

THE CANADIAN NATIONAL has ordered 60 Hart-Otis ballast cars, from the Canadian Car & Foundry Company, and 200 from the Eastern Car Company.

THE CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC has ordered 200 ore cars from the Pressed Steel Car Company. Inquiry for this equipment was reported in the *Railway Age* of February 25.

THE CHINESE EASTERN RAILWAY COMMISSION will receive bids on May 2, at Harbin, China, for 660 closed goods wagons, of 25 tons' capacity, with two axles, and for 330 wagons, of 50 tons' capacity, with four axles.

THE NORTH AMERICAN CAR CORPORATION has ordered 300 refrigerator cars from the Pressed Steel Car Company and is now inquiring for 500 8,000-gal. capacity tank cars in addition to the 300 live poultry cars reported in the *Railway Age* of March 3.

THE ALUMINUM COMPANY OF AMERICA has ordered one 8,000-gal. capacity experimental tank car from the Standard Tank Car Company. The tank and all its fittings will be made of aluminum in order that service tests may be made to determine the advantages of this material from a corrosion-resisting standpoint.

Passenger Cars

THE CANADIAN NATIONAL has ordered 69 cars for passenger train service as follows: 5 cafe parlor cars, 2 buffet club cars and 30 colonist cars from the Canadian Car & Foundry Company; 12 baggage cars and 20 colonist cars from the National Steel Car Corporation. Inquiry for 55 cars was reported in the *Railway Age* of March 3.

Iron and Steel

THE BOSTON & MAINE is inquiring for 150 tons of steel for bridges.

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for 50 tons of structural steel for repairs to bridge over the Mississippi river, at Rock Island, Ill.

THE PENNSYLVANIA is inquiring for 400 tons of steel for a bridge at Harrisburg, Pa.

THE CENTRAL OF NEW JERSEY is inquiring for about 150 tons of steel for a bridge at Scranton, Pa.

THE NEW YORK, NEW HAVEN & HARTFORD is inquiring for 600 tons of steel for a building in the Borough of the Bronx.

THE UNION PACIFIC is inquiring for 650 tons of structural steel for sheds at Ogden, Utah.

THE CHICAGO & ALTON is inquiring for 200 tons of structural steel for a bridge at Gardner, Ill.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS is inquiring for 150 tons of structural steel for a bridge at Sharonville, Ohio.

Signaling

THE INDIANAPOLIS UNION has ordered from the Union Switch & Signal Company, material for 58 flashing-light highway crossing signals. These signals are to have an illuminated "stop" sign. The operating current procured from commercial sources, will be supplemented by reserve storage batteries.

Santa Fe Orders 308 Miles of Signals

The Atchison, Topeka & Santa Fe has ordered from the Union Switch & Signal Company, material for the installation of automatic block signals on 76.2 miles of its Eastern Lines; 198.2 miles of its Western Lines; 56.8 miles on the Gulf, Colorado & Santa Fe and 76.4 miles on the Coast Lines; a total of 308.2 miles. The order includes 600 semaphore signals, 135 color-light signals, and other apparatus; it also includes 27 low-voltage switch movements for remote operation, and three spring-switches.

The principal sections of road to be signaled are as below, all not otherwise noted being single track: *Eastern Lines*: Newton, Kan., to Wichita, 24 miles, single track, two miles, double track; Newkirk, Okla., to Cross, 10.5 miles, single track; Richmond, Kan., to Iola, 36.4 miles; Mulvane, Kan., to Bloomfield, 22.9.

Western Lines: Attica Kan., to State Line 24.2; State Line to Brink, Okla., 10.8; Brink to Noel, 8.4; Noel to Avard, 6.7; Shattuck, Okla., to State Line, 8.6; State Line to Canadian, Tex., 32.1; Fort Sumner, N. M., to Ricardo, 13.5; Cardenas, N. M., to Vaughn, 25.7; Vaughn to Carnero, 10.4; Carnero to Willard, 44.2; Willard to Mountainair, 13.6.

G. C. & S. F.: Saginaw, Tex., to Gainesville, 56.8. Six of the remotely operated switches are to be on the G. C. & S. F.

Coast Lines: Chambers, Ariz., to Carrizo, 32.5 miles, double track; Belan, N. M., to Dalies, 10.3 miles, s. t., color-light; Riverside, Cal., to Corona, 14.3 miles; Fullerton, Cal., to Hobart, 19.3.

Supply Trade

Bentley & Holmgren, Court Exchange building, Bridgeport, Conn., have been appointed representatives for Connecticut and western Massachusetts for the **Foote Bro. Gear & Machine Co.**

Paul Willis has been elected a vice-president of the **J. S. Coffin, Jr., Company,** Jersey City, N. J., having resigned his position as district manager of the Franklin Railway Supply Company, Inc.

C. E. Preble, who has had charge of the engineering department of the **Heywood-Wakefield Company,** at Wakefield, Mass., has been appointed assistant to Bertram Berry in the railway sales department at New York.

Fred C. Conners having resigned as secretary, assistant treasurer and director of **A. M. Castle & Co.,** Chicago, effective March 19, the board of directors have elected **Leonard J. Quetsch,** secretary and director to succeed Mr. Conners.

Leeds, Tozzer & Company, Inc., New York, has been appointed representative of the tramrail system in Manhattan, Bronx and Staten Island, New York, for the Cleveland electric tramrail division of the **Cleveland Crane & Engineering Company,** Wickliffe, Ohio. **Leeds, Tozzer & Company, Inc.,** has been appointed distributor to the railroad field of the line of Stuebing-Cowan, hand and electric lift trucks and steel bound platforms.

Harold P. Childs, vice-president in charge of sales and advertising of the Servel Corporation has resigned to become general sales manager of the **Standard Underground Cable Company,** Pittsburgh, Pa., to succeed **A. B. Saurman,** vice-president and general sales manager, who has been appointed vice-president and consulting general sales manager.

The **W. N. Matthews Corporation,** St. Louis, Mo., has opened a branch office in the real estate building, Philadelphia, Pa., under the management of **J. B. Harris,** for sales in Pennsylvania east of Altoona and in Delaware. The **E. S. Stickle Company,** Union Trust Building, Pittsburgh, Pa., has been appointed representative to succeed M. P. McClure and will handle sales in Pennsylvania west of Altoona, West Virginia, and a portion of Ohio. **A. L. Link** has been appointed representative at 40 West Seneca Street, Buffalo, N. Y., to cover New York, west of but not including Albany.

John G. Platt, vice-president of the **Hunt-Spiller Manufacturing Corporation,** Boston, Mass., has been elected president and general manager, effective March 21. Mr. Platt was born at Zanesville, Ohio, on February 11, 1874. Five years later his parents moved to Baltimore, Md., an dhe was educated in the public schools of that city. He entered railway service at an early age as a messenger for the Baltimore & Ohio. In January, 1890, he became an apprentice in the locomotive department of the same railroad, entering the drafting room as a locomotive draftsman in 1894. On February 1, 1901, he was transferred to Newark, O., as chief draftsman of

John G. Platt

the Baltimore & Ohio, Lines West. On December 20, 1902, he left the Baltimore & Ohio to become assistant to the master mechanic of the Erie at Jersey City, N. J. He was transferred to Meadville, Pa., in April, 1903, as engineer of tests serving in that capacity for several years. On February 1, 1907, he left railway service to become master mechanic of the Franklin Branch of the American Steel Foundry, in which position he remained until June 1 of the same year, when he entered the service of the Hunt-Spiller Manufacturing Corporation as mechanical representative. On June 1, 1912 he was appointed sales manager, and on March 14, 1917, was appointed vice-president. His recent election to the presidency follows the death of the corporation's late president, Walter B. Leach.

E. J. Fuller has been appointed sales manager of the **Hunt-Spiller Manufacturing Corporation,** effective March 21.

E. J Fuller

Mr. Fuller was born in Clinton, Iowa, in 1884 where he was educated in the public schools. At an early age he entered the service of the Chicago &

North Western as a machinist's apprentice at Clinton. After completing his apprenticeship he remained at Clinton as machinist and was later foreman of the machine department. During the year 1913 he was chief inspector of new equipment for the Chicago & North Western at the works of the American Locomotive Company, at Schenectady, N. Y. He left railroad service to enter the employ of the Hunt-Spiller Manufacturing Corporation as mechanical representative on April 1, 1914, serving in that capacity until February 1, 1928, when he was appointed assistant sales manager. His appointment to sales manager on March 21 is to succeed V. W. Ellet, who has been elected vice-president.

Victor W. Ellet has been elected vice-president of the **Hunt-Spiller Manufacturing Corporation,** Boston, Mass., effective March 21. Mr. Ellet was born in Burlington, Iowa, June 11, 1880. In 1886 his parents moved to Fort Madison, Iowa, where he was educated in the public schools and at Johnson's Business College, and he completed a railroad engineering course in the In-

Victor W. Ellet

ternational Correspondence School. He served his apprenticeship as machinist with the Atchison, Topeka & Santa Fe, at Fort Madison, completing the apprenticeship in 1901. After this time he worked for the St. Louis, Iron Mountain & Southern (Mo. P.), Fort Worth & Denver City, the Choctaw, Oklahoma & Gulf (C. R. I. & P.), thereafter returning to the Santa Fe at Fort Madison. He also served as expert tool maker in the United States arsenal at Rock Island, Ill. In 1905 he returned to railroad service as mechanical foreman on the Missouri Pacific at Hoisington, Kans. In 1906 he entered the service of the Chicago, Rock Island & Pacific serving in the mechanical department as general foreman at Valley Junction, Iowa, Fairbury, Neb., Chicago and Rock Island, Ill. On April 1, 1911, he entered the employ of the Hunt-Spiller Manufacturing Corporation as mechanical representative. He was appointed sales manager of this company in September, 1925, serving in this capacity until his appointment as vice-president succeeding John G. Platt, who has been elected president.

E. M. Converse has been appointed sales manager of the **Dearborn Chemical Company, Chicago,** to succeed **W. A. Converse,** secretary and chemical director, who has been director of sales in the stationary department and who will now devote more of his attention to matters of general company operation. E. M. Converse received his education in chemistry and chemical engineering at Armour Institute and

E. M. Converse

Northwestern University and entered the employ of the Dearborn Chemical Company in 1902 as a laboratory assistant. In 1906 he was placed in charge of the inspection of material, which position he held until 1918 when he was transferred to the sales and service department. He was then appointed manager of the specialties department, which position he held until his recent appointment which involves the merger of the stationary and specialty departments under his direction.

Ryan Car Company

The annual report of the Ryan Car Company as of December 31, 1927, shows a profit of $23,260 as compared with a loss of $124,037 in the previous year. Gross sales amounted to $2,049,071 as compared with $1,402,639 in 1926. Assets amounted to $3,092,893 as compared with $2,888,594. During the year $493,263 was spent for the development of new products. The capital stock authorized and outstanding consists of $2,500,000 of which $2,000,000 represents 80,000 shares of common stock with a par value of $25 and $500,000 represents 5,000 shares of preferred with a par value of $100. The operating statement follows:

	1927	1926
Gross sales	$2,049,071	$1,402,639
Cost of manufacture (excluding depreciation)	1,995,874	1,486,255
Profit or loss before depreciation	†$53,197	*$83,616
Depreciation charged off	92,409	79,907
	*$39.212	*$163,523
Profit on securities, discounts, interest, miscellaneous, debits and credits	62,472	39,485
Profit or Loss for year	†$23,260	*$124,038

* Loss; † Profit.

Statement of President W. M. Ryan to stockholders, in part, follows:

It will be noted that while the gross business in 1927 was only about half of that in 1925, the net results were considerably more favorable, due partly to the company's efforts to reduce expenses and partly to the better prices obtained. These together with a greater profit from securities purchased, resulted in a net profit of $23,260 as against losses totalling $209,611 in the previous two-year period. This profit, it will be seen, was not sufficient to take care of the dividends of $40,000 per annum on the preferred stock.

The expenditures to date on the development of the Locomotor, a self-propelled steam passenger car for railway use, and the Ryan road grading machine have not brought them to a state of perfection where the sales work can be aggressively undertaken. The promotion of the Locomotor if done in the way that its great sales value warrants is an undertaking requiring more capital than could be furnished by your company and your management is, therefore, actively considering the formation of a new company with additional capital to handle it. Your company would take stock in the new company in exchange for the Locomotor development. This should make it possible to make headway with this branch of the business in a larger field and more quickly.

Fairbanks, Morse & Co.

The annual report for the year 1927 shows a net profit, after deducting all charges, of $1,641,606 as compared with $2,740,386 in the previous year. Assets amounted to $38,939,938, compared with $37,744,624 in 1926. The consolidated income and surplus account as of Decem-31, 1927, follows:

	1927	1926
Operating profit for the year ending December 31, 1927, after deduction of manufacturing, selling and administrative expenses	$3,266,966	$4,387,227
Deduct:		
Depreciation of buildings and equipment	898,749	856,085
Interest on debentures	342,222	248,685
Contributions to the pension fund	128,183	114,381
Federal income tax for the year	256,206	427,690
	$1,625,360	$1,646,841
	$1,641,606	$2,740,386
Surplus and undivided profits at December 31, 1926, per last report:		
Fairbanks, Morse & Co.	$11,853,361	$11,364,598
Subsidiary companies	1,845,612	1,311,866
	$13,698,973	$12,676,464
Deduct:		
Premium paid on preferred stock retired	$14,476	$17,691
Patents, good will, etc., written off on books of subsidiaries	.....	70,000
Sundry adjustments to surplus on books of subsidiaries	.....	8,278
Discount and expense on 15 year 5 per cent debenture issue	$457,254	.....
Wisconsin tax settlement pertaining to prior years	173,207	.....
Other adjustments pertaining to prior years	155,906	.....
	$800,843	$95,969
	$12,898,130	$12,580,495
	$14,539,738	$15,320,881
Dividends for the year:		
On 7 per cent preferred stock	$503,321	$515,426
On common stock	1,106,526	1,106,482
	$1,609,847	$1,621,908
Balance, December 31, 1927	$12,929,889	$13,698,973

C. H. Morse, Chairman of the Board, in his statement to stockholders, said in part:

The net billings to customers for the 12 months amounted to $28,391,416, compared with $31,550,384 for 1926, a reduction of $3,158,968. The total orders received during the same period aggregated $28,676,975, compared with $32,-038,739.

The results for the year should be considered satisfactory in view of conditions, both preferred and common stock dividends having been earned. The earnings were below those for 1926, due to a continuance of the conditions in the South. Business was further handicapped by the disastrous floods in Missouri and adjoining states, the result of which was to curtail purchases by our customers in what is usually very productive territory.

The consolidated net profit for the year, after provision for depreciation, debenture interest, pension fund contributions, and federal income tax, amounts to $1,641,606. Preferred and common stock dividends have absorbed $1,609,847, leaving a balance of undivided profits for the year of $31,759 which, added to the adjusted surplus at the end of 1926, brings the total surplus and undivided profits of the company and its subsidiaries at the close of the year to $12,929,889 and gives a book value of over $55.00 per share to the 368,977 shares of common stock outstanding.

Pullman, Incorporated

The report of Pullman, Inc., for the last eight months of 1927 shows earnings from all sources of $12,292,246 after deducting expenses incident to operations, depreciation and the reserve for federal income tax. A total of $750,000 was placed in reserve for pensions and $40,000 for trust benefits. $3,351,042 was paid in dividends on Pullman, Inc., stock, $2,699,794 on Pullman Company stock and $19,109 was the proportion of dividends of subsidiary corporations paid to minority stockholders. After these amounts, there was a total of $5,432,301 carried to surplus. The assets on December 31, 1927 totaled $302,818,361. The consolidated income account for Pullman, Inc., and all subsidiaries for the eight months follows:

EARNINGS:	
From carrier business of the Pullman Company after deducting all expenses incident to operations	$15,915,003
Less: Charges and allowances for depreciation	6,747,940
	$9,167,063
From all manufacturing properties and Pullman Railroad, after deducting all expenses incident to operations	$4,424,883
	778,228
	$3,646.655
From investments, etc.	$1,605,444
Total earnings from all sources	$14,419,162
Less: Reserve for Federal income tax	2,126,916
Balance of earnings	$12,292,246

The statement of Edward F. Carey, president, to stockholders in part follows:

Pullman, Inc., was organized on June 21, 1927, under the laws of the state of Delaware, for the purpose of taking over, in pursuance of a plan of reorganization, the Pullman Company and the Pullman Car & Manufacturing Corporation. The report is for the eight months period from May 1, to December 31, 1927. The calendar year has been adopted as the fiscal year of the company and all subsidiaries, subsequent annual reports heretofore will be for the full calendar year.

There was a falling off in gross business of the Pullman Company, during the eight months ending December 31, 1927, as compared with the corresponding months of the previous year, equal to about two per cent, but as a result of economies, this decrease is more than offset by a reduction in expenses. During the eight months period ending December 31, the number of cars operated was approximately the same as during the corresponding period of the previous year, although there was a reduction of about 3½ per cent in the number of passengers carried. To provide for replacement of equipment retired from service and in accordance with the policy of the Pullman Company to furnish modern equipment for the convenience of the traveling public a program of construction was continued and as of December 31, 1927, the Pullman Company owned 9,068 sleeping, parlor and other classes of cars.

General Electric Company

Earning of the General Electric Company for 1927 amounted to $48,799,488, equivalent, after dividends on the special stock, to $6.41 a share on the 7,211,481 shares of no par common stock according to the annual report of the company made public on March 28 by President Gerard Swope. This compares with $6.14 a share in 1926.

Orders received during the year 1927 were $309,784,623, compared with $327,400,207 in 1926, a decrease of 5 per cent, and unfilled orders at the end of the year were $68,916,000, compared with $72,297,000 at the close of 1926, also a decrease of 5 per cent.

A comparison of income and expenses for the two years ending December 31 follows:

	1927	1926
Net sales billed	$312,603,772	$326,974,104
Less: Cost of sales, including operating, maintenance and depreciation charges, reserves and provision for all taxes	276,454,003	289,878,335
Net income from sales	36,149,768	37,095,768
Income from other sources:		
Income from associated companies	5,642,885	4,937,901
Income from miscellaneous securities	1,010,164	915,836
Interest and discount	3,262,924	3,047,049
Income from U S. Government securities	3,787,064	2,647,502
Royalties and sundry revenue	1,692,882	1,013,238
	15,395,918	12,561,526
Total income	51,545,687	49,657,295
Less: All interest payments	284,486	436,512
Addition to general reserve	2,461,712	2,548,284
	2,746,198	2,984,796
Profit available for dividends	48,799,489	46,672,499
Less: 6% cash dividends on special stock	2,574,447	2,357,614
Profit available for dividends on common stock	46,225,042	44,314,884
Less: Cash dividends on common stock	34,251,774	19,828,897
Dividend paid in special stock		7,210,810
Surplus for the year	$11,973,268	$17,275,178

Obituary

Gaetano Lanza, consulting engineer for fifteen years with the Baldwin Locomotive Works, died on March 21, after a short illness at the age of 80.

Fleming Ramsaur, president of the Jefferson Construction Company, of Charleston, S. C., and Baltimore, Md., died on March 9 at Charlotte, N. C., at the age of 59. Mr. Ramsaur served as an engineer throughout the South Atlantic states, with various railway enterprises during the past thirty years. In addition to railroad work, Mr. Ramsaur was in charge as chief engineer of the construction of the Coquitlam Hydraulic Fill Dam near Vancouver, British Columbia.

CHICAGO, ROCK ISLAND & PACIFIC.—A contract has been let to the Railroad Water and Coal Handling Company, Chicago, for the construction of a water treating plant at Silvis, Ill. A contract for the installation of a boiler washing plant at Forty-seventh street, Chicago, has been let to the F. W. Miller Heating Company, Chicago.

* * *

THE PULLMAN COMPANY
Traffic and Operating Statistics
Comparative Statement for Years Ended December 31

Item	1923	1924	1925	1926	1927
Cars operated	7,267	7,600	8,238	8,639	8,689
Car miles	890,719,336	943,334,475	1,043,663,099	1,112,967,022	1,140,476,049
Revenue passengers:					
Berth	21,489,952	21,419,639	22,470,751	22,658,191	22,042,093
Seat	12,759,493	12,666,117	13,055,052	13,415,020	13,155,085
Total	34,249,445	34,085,756	35,525,803	36,073,211	35,197,178
Revenue passenger miles	12,981,609,680	13,083,037,763	14,017,394,915	14,407,455,160	14,096,775,086
Revenue from cars	$73,683,327	$73,900,608	$81,490,323	$83,191,087	$82,250,940
Expenses from cars	$64,308,084	$66,388,393	$68,967,083	$73,638,331	$71,891,743
Net revenue from cars	$ 9,375,243	$ 7,512,215	$12,523,240	$ 9,552,756	$10,359,197
Traffic averages:					
Average revenue per car operated	$ 10,139.16	$ 9,724.40	$ 9,891.52	$ 9,629.94	$ 9,466.64
Average revenue per passenger	$ 2.15	$ 2.17	$ 2.29	$ 2.31	$ 2.34
Average net revenue per passenger	$ 0.27	$ 0.22	$ 0.35	$ 0.26	$ 0.29
Average net revenue per car per day	$ 3.53	$ 2.70	$ 4.16	$ 3.03	$ 3.27
Average mileage per car operated (miles)	122,567	124,131	126,683	128,834	131,263
Average journey per passenger (miles)	379	384	395	399	401
Average miles per car per day (miles)	336	339	347	353	360
Average loading per car (passengers)	14.57	13.87	13.43	12.95	12.36

Photo H. F. O'Neil

C. M. & St. P. Train Near Lake Street Bridge, Chicago

Construction

ATCHISON, TOPEKA & SANTA FE.—Bids are being requested by this company for the construction of a coaling station at Galesburg, Ill.

BALTIMORE & OHIO.—This road has let a contract to the Hawkins Construction Company, Newark, O., for the construction of a freight house and freight handling facilities at Newark, which will cost about $100,000.

BALTIMORE & OHIO.—This company closes bids on April 4 for the construction of a coaling station at Rossford terminal, Toledo, Ohio. The station will have a capacity for 300 tons of coal and 150 tons of sand.

BANGOR & AROOSTOOK.—This road is making plans for the eliminaton of a highway crossing at Northern Maine Junction, which will necessitate the raising of track and crossing over a highway. This work will be done by company forces and will cost about $45,000.

CANADIAN NATIONAL.—Tenders were received at Winnipeg, Man., until March 31 for the construction of a water supply system at Willowbunch, Sask., and for the construction of mechanical coaling docks at Sturgis, Sask., Medstead and Hudson Bay Junction.

CHICAGO & NORTH WESTERN.—A contract for the construction of a concrete block and tile combined passenger and freight station at Carrollville, Wis., has been let to Henry Danischefsky. This station will have outside dimensions of 22 ft. by 88 ft.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—This company receives bids until April 11 for the construction of a water treating plant at South Minneapolis, Minn.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—This company has submitted plans to the city of Minneapolis, Minn., for the elevation of its tracks across 19 streets between its station and East Twenty-sixth street in that city. The cost of the project is estimated at about $4,000,000.

CHICAGO, ROCK ISLAND & PACIFIC.—A contract has been awarded to A. Guthrie & Co., St. Paul, Minn., for the construction of an extension of the Amarillo-Stinnett branch from Stinnett, Tex., to Gruver, 34 miles. The excavation of more than 1,500,000 cu. yd. of earth is involved in the construction of this line.

DELAWARE, LACKAWANNA & WESTERN.—This road has let a contract to the Lowman Construction Company of Elmira, N. Y., for the construction of a three-story brick Y. M. C. A. building, 86 ft. by 48 ft., at Elmira at an estimated cost of $75,000.

DETROIT, TOLEDO & IRONTON.—A contract for the construction of the reinforced concrete abutments for four grade separation structures over highways on the Malinta-Durban cutoff in Michigan and Ohio has been awarded to A. Guthrie & Co., St. Paul, Minn.

GREEN BAY & WESTERN.—A contract has been awarded to the Zenith Dredge & Dock Co., Duluth, Minn., for the construction of a 40 ft. by 600 ft. frame and pile dock at Green Bay, Wis., at a cost of about $150,000. This project involves the excavation of about 100,000 cu. yd. of earth.

MAINE CENTRAL.—This railroad closed bids on March 26 for the construction of a new passenger station, freight house and freight yard at Ellsworth, Me. Work involved will cost approximately $109,000.

PENNSYLVANIA.—A contract has been let to the T. J. Foley Company of Pittsburgh, Pa., for masonry work on an additional span at the north end of the Manayunk bridge over the Schuykill river at Philadelphia, Pa., to cost $42,000. A contract has also been let to this company for the construction of an overhead bridge to eliminate a grade crossing at Stony Brook, Pa. at a cost of $42,000.

VIRGINIAN, NORFOLK & WESTERN, CHESAPEAKE & OHIO.—The Interstate Commerce Commission on March 23 made public a proposed report by Examiner Haskell C. Davis on the applications filed by these companies, or subsidiaries, for authority to build new lines in the Guyandot river basin of West Virginia. The report recommends that the Virginian & Western be granted a certificate for its proposed line from a connection with the Guyandot river branch of the Virginian at or near Itmann, down the Guyandot river to a connection with the Chesapeake & Ohio at or near Gilbert, 40.6 miles. He also recommends that the Guyandot & Tug River, a subsidiary of the Norfolk & Western, which had asked to be allowed to build from a connection with the Virginian at or near Elmore in a general westerly direction to Wharncliffe, 53 miles, be given a certificate only for a line from Gilbert to Wharncliffe. The Chesapeake & Ohio had also asked authority to build from the southern terminus of its Logan division at or near Gilbert to Mullens, 47.3 miles, and the examiner recommends that its application be denied. The applicants had all agreed that but one line should be built between Elmore and Gilbert. "The main functions of all the proposed lines are the same," says Examiner Davis, "viz. (a) to provide a suitable outlet for westbound traffic, chiefly coal, from the lines of the Virginian and C. & O. in the upper Guyandot basin; and (b) to carry the traffic to be developed by the proposed construction. The latter may be understood to include the desire of each applicant to include the coal of the basin in its reserves. The N. & W. and Virginian, in particular, have urged their needs in this respect, and the C. & O. also claims for its project some value for moving eastbound coal from the upper part of its Logan subdivision."

Financial

CANADIAN PACIFIC.—*Annual Report.*—The annual report for 1927 shows net income after interest and other charges of $5,407,320, equivalent after the 4 per cent dividends on the preferred stock, to $12.08 per share on the ordinary stock outstanding at the end of the year, exclusive of the stock issued during the year which was not full paid until February 15, 1928. The net income in 1926 was $8,519,095, or $14.12 per share. See excerpts from annual report on adjacent pages.

GEORGIA SOUTHERN & FLORIDA.—*1927 Earnings.*—A preliminary statement of earnings for 1927 shows net income after interest and other charges of $98,336, equivalent after allowance for the 5 per cent dividends on the first and second preferred stocks, to 49 cents per share on the outstanding common stock. The net income in 1926 was $653,317, or $28.24 per share. Selected items from the income statement follow:

GEORGIA SOUTHERN & FLORIDA	1927	1926
Average mileage operated	401.81	401.81
RAILWAY OPERATING REVENUES	$4,863,249	$6,764,554
Maintenance of way	1,003,736	1,002,573
Maintenance of equp't	922,640	1,087,201
Transportation	1,895,875	2,584,220
TOTAL OPERATING EXPENSES	4,088,149	5,071,913
Operating ratio	84.07	74.98
NET REVENUE FROM OPERATIONS	775,100	1,692,641
Railway tax accruals	243,062	334,011
Railway operating income	420,253	953,254
Equipment rents, Dr.	83,800	369,321
Joint facility rents, Dr.	25,883	32,083
Non-operating income	29,762	40,220
GROSS INCOME	450,015	993,474
Interest on funded debt	298,039	298,489
TOTAL DEDUCTIONS FROM GROSS INCOME	346,376	350,681
NET INCOME	98,336	653,317
Disposition of net income		
Dividends on preferred stock: 5 per cent	88,400	88,400
Dividends on common stock: 5 per cent		100,000
Surplus for year carried to profit and loss	9,936	464,917

PENNSYLVANIA.—*To Sell $80,000,000 New Stock.*—The directors of the Pennsylvania Railroad Company have authorized an increase in the company's capital stock of $80,000,000. Of this not exceeding, $62,500,000 will be offered to stockholders of record at the close of business April 14, 1928, at par to the extent of 12½ per cent of their holdings. The remaining $17,500,000 will be sold to the employees, the sale to be made at such time, in such manner and amount, and at such prices —not less than par—as the directors may order.

Stockholders will be given the privilege of paying for the stock in full or in two installments. The date fixed for the payment of subscriptions to the capital stock, either in full or the first installment, is

(*Continued on page 783*)

Annual Reports

Thirty-Fourth Annual Report of Southern Railway Company
Year Ended December 31, 1927

RICHMOND, VA., March 13, 1928.

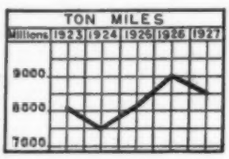
To the Stockholders of

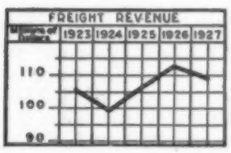
SOUTHERN RAILWAY COMPANY:

The Board of Directors submits the following report of the affairs of the Company for the year ended December 31, 1927:

A Normal Year for Freight Traffic.

The volume of freight handled last year was below the record volume of 1926, although larger than for any other previous year. Measured in ton-miles (tons multiplied by distance) there was a decrease of 5.99% compared with 1926, but an increase of 6.11% over the average of the three years 1923-4-5. Shipments of many important commodities were smaller in 1927 than in 1926, including lumber, coal, iron, steel, automobiles, fertilizer, grain, peaches, apples and watermelons, although of some commodities larger shipments were handled, including cotton, live stock, citrus fruits and petroleum products.

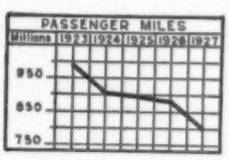




The dollar revenue from freight traffic declined 3.05% compared with 1926, but was 5.11% above the average of the three years 1923-4-5.

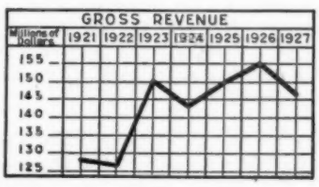
The Significant Tendency of Passenger Traffic.

The volume of passenger traffic, as well as the revenue from that source, continued the decline which has been characteristic of that feature of the railroad business for the past several years. This decline on the Southern was partly arrested in the years 1925 and 1926 by reason of the high tide of through travel to and from Florida during the greater part of those two years, but with the recession of that tide in the latter part of 1926 the full effect of the loss of local passenger business on the aggregate passenger revenue again became apparent. During the past year this revenue was $26,749,397, the lowest for any year since 1917, when the figure was $24,303,182. The number of passengers carried in 1927, viz: 8,093,490, compares with 9,208,549 in 1926 and with an annual average of 17,810,803 in the three years 1915-6-7. Thus it will be seen that the number of passengers on our trains has been reduced one-half in ten years. But by reason of the fact that the long distance business has improved while the local business has been declining, the comparison of the passenger revenue unit (passenger miles, *i. e.*, number of passengers multiplied by average journey) makes a more favorable comparison. For 1927 the number of passenger miles was 788,884,193 compared with an annual average of 891,694,385 for the three years 1915-6-7. The revenue per passenger train mile in 1927 (including mail, express and miscellaneous earnings, as well as passenger) makes a still better comparison with the earlier period by reason of increased passenger fares, effective in 1920, and such reduction in local passenger train mileage as could be effected. For 1927 this figure was $2.24 compared with an average of $1.50 for the three years 1915-6-7. The operating expense per passenger train mile (calculated by assigning to passenger train service and charges directly applicable thereto and dividing expenses common to both passenger and freight service according to the formulæ of the Interstate Commerce Commission) in 1927 was $1.88. This indicates a profit of 36c per passenger train mile, or a total profit of $5,733,000 from passenger train business during 1927. The profit, similarly calculated, from passenger train operations for the average of the three years 1915-6-7 was 60c per passenger train mile or a total of $9,779,000. These statistics negate the popular assumption that railroad passenger traffic has become unprofitable. They do show, however, that the net return from passenger business has declined about forty per cent. during the last ten years. In this situation it is interesting to note that the decrease of 11.96% in the Southern's passenger revenue in 1927 compared with 1926 was less severe than the decrease on other railroads in the Southern region, which averaged 17.52%.



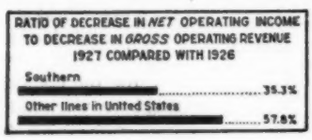
Total Operating Revenue.

The total revenue derived from the operation of the railroad was $147,639,062, a figure substantially below the record attainment of the preceding year, slightly less also than the annual revenues for 1925 and 1923, but larger than the yearly returns for the years 1924, 1922 and 1921.



A Successful Year in Expense Account Control.

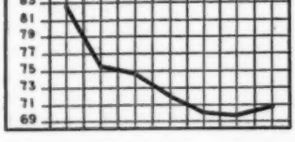
With a decrease of $7,828,913 in gross revenue, the expense account was so controlled that the comparative loss in net was limited to $2,763,720. Thus the net loss was 35.3% of the loss in gross. This result was not obtained at the expense of the property. By far the largest contribution was a cut of $2,517,715 in the item of conducting transportation, compared with reductions of $712,820 in maintenance of way and structures and of $692,406 in maintenance of equipment. The appropriations out of the dollar of gross revenue, in the two years, for the several general heads of operating expenses were as follows:


RATIO OF DECREASE IN NET OPERATING INCOME TO DECREASE IN GROSS OPERATING REVENUE 1927 COMPARED WITH 1926
Southern
35.3%
Other lines in United States
57.6%

	1927	1926
Transportation of the traffic	33.42c	33.36c
Maintaining roadbed and structures	13.77c	13.54c
Maintaining rolling stock	17.67c	17.22c
Traffic solicitation and supervision	2.06c	1.99c
General expenses	2.83c	2.60c
Operating dining cars and other incidental services	.63c	.67c
Totals	70.38c	69.38c

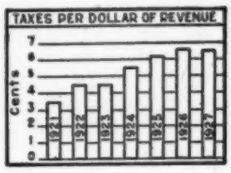
The transportation cost of 33.42c per dollar of revenue on the Southern in 1927 compares with an average transportation cost of 35.47c per dollar of revenue on the other railroads in the Southern region and with an average of 34.96c on all of the class one railroads of the United States.

The principal transportation expense units in 1927 compare favorably with those of 1926, especially when considered in the light of the reduced volume of traffic, *e. g.*: the average number of tons of freight per train increased 1.76%; the number of gross ton miles per freight train hour increased 8.80%; the wage cost of freight train crews per thousand gross ton miles decreased 4.13%; overtime wage payments in train and engine service decreased 28.43%; coal consumption per thousand gross ton miles decreased 4.19%; coal consumption per passenger car mile decreased 1.14%; total freight train transportation expense per thousand gross ton miles decreased 4.94%; the net charge against the Company for hire of equipment decreased 30%.



Taxes.

The tax bill for 1927 was $9,454,004 compared with $10,351,100 for 1926, a decrease of $897,096, or 8.67%. Unfortunately this does not afford evidence of approaching relief from the ever growing burden of property taxes, which were larger in 1927 than in any previous year. The total tax bill was less only by reason of smaller income taxes as the result of a smaller income.



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Interest and Rental Charges.

The disbursement for interest on mortgage bonds and equipment trust obligations and rentals for leased railroads, viz: $17,528,732, was approximately the same as in 1926, when it was $17,519,061.

Income from Investments.

Income from sources other than operation, including interest and dividends on corporate and Government securities owned, and interest on bank balances, was $6,823,150, an increase of $966,196, or 16%, over the like income in 1926.

Net Income.

The balance of income over fixed charges in 1927 was $21,699,908, equivalent to $14.40 per share on the common stock after providing for the dividend on the preferred stock, compared with $23,596,722, equivalent, after preferred dividend, to $15.87 per share earned on the present common stock capitalization in the preceding year.

Dividends.

The preferred dividend of five per cent. and a dividend of seven per cent. on the common stock were paid in quarterly installments during the year, requiring $11,907,405, an increase of $507,405 over the preceding year, when the dividend rates were the same but the number of shares of common stock was smaller. On December 8, 1927, the dividend rate on the common stock was increased to eight per cent. with the declaration of a quarterly dividend of two per cent. payable on February 1, 1928.

Additions to the Property.

The movement of trains on all of the Company's fast passenger and high train density lines is now protected and expedited by automatic train control devices as well as by electric block signals. This became an accomplished fact with the completion during the year of such installations between Bristol and Memphis, between Charlotte and Columbia, and between Asheville and Spartanburg.

Modern engine terminal facilities were built at Andrews Yard (Columbia), Winston-Salem and Jacksonville, replacing inadequate facilities.

The yards at Columbia, Winston-Salem, Greensboro and Durham were enlarged.

Concrete and steel coal chutes, with cost reducing coal handling machinery, were constructed at Monroe, Va., Atlanta Junction, Ga., Anniston, Ala., Sheffield, Ala., Coster, Tenn., Bulls Gap, Tenn., and Lawrenceburg, Ky.

To increase the water supply and reduce the pumping cost, improved water facilities were provided at a number of points, including water softening apparatus in some of the limestone regions.

Telephone train dispatching and message circuits were installed between Greensboro and Winston-Salem, between Bristol and Knoxville, and between Chattanooga and Memphis, a total of 489 miles.

A new freight depot to serve both Asheville and Biltmore was erected on a favorable site near Biltmore. Extensions to freight depot facilities were made at Charlotte, N. C., Rock Hill, S. C., Hendersonville, N. C., and at a number of smaller stations.

The structures on the line between Greensboro and Selma, N. C., a distance of 109 miles, were strengthened to permit the use of heavier power.

A total of 260 miles of new 100-lb. rail was laid during the year replacing 85-lb. rail.

Forty-three new locomotives, 5,450 new freight cars and 25 new passenger train cars have been contracted for. The cost of this equipment was $12,312,950, which will be paid partly from current treasury funds and the remainder from the proceeds of sale of $9,840,000 Series "BB" 4% equipment trust certificates, dated March 1, 1928, payable in thirty equal semi-annual installments.

Industrial and Agricultural Development.

Diversified industrial expansion continues throughout the South. During the past year two hundred and eighty-two new manufacturing industries were established on the lines of Southern Railway System and two hundred and sixty-four additional plants were enlarged.

The year witnessed substantial additions to the iron producing furnace and foundry capacity of the South. Worthy of special mention also are the construction at Atlanta of a great automobile assembling plant and additions to several of the large tobacco factories in North Carolina.

In Southern cotton mills 502,210 new spindles were installed during the past year, bringing the total number to 18,299,832. These spindles spun 73% of the total amount of cotton used in the mills of the United States.

The South now has three large plants engaged in the manufacture of artificial silk or rayon. Two of these are being en-

Financial Results for the Year

	1927	1926
The Company received from freight, passenger and other miscellaneous operations a total revenue of	$147,639,062	$155,467,975
The cost of maintaining the property and of operating the railroad was	103,907,953	107,866,588
Leaving a balance from railroad operations of	$43,731,109	$47,601,387
Federal, State and local taxes, (plus a small amount of uncollectible items) required	9,488,877	10,394,891
Leaving a balance of	$34,242,232	$37,206,496
The Company paid to other companies for hire of equipment and use of joint facilities in excess of the amount received by it from those sources	1,477,170	1,677,713
This leaves an income from railway operations of	$32,765,062	$35,528,783
Other income derived from investments in stocks and bonds of affiliated companies and miscellaneous items was	6,823,150	5,856,954
Making a total income of	$39,588,212	$41,385,737
Interest on funded debt and equipment obligations, rents paid for leased railroads, and other miscellaneous deductions totalled	17,888,304	17,789,015
There then remained a balance available for dividends, working capital and other corporate purposes of	$21,699,908	$23,596,722
The regular dividends on the 5% Preferred stock were	3,000,000	3,000,000
This left a balance of	$18,699,908	$20,596,722
The earnings per share of common stock on basis of the 1,298,200 shares now outstanding were equivalent to	$14.40	$15.87

Financial Position at the End of the Year

	December 31, 1927	December 31, 1926	Increase or Decrease
The Company has investments in land, railroad tracks, terminal facilities, shops, locomotives, freight and passenger cars and other fixed property of	$531,471,776	$522,868,716	$8,603,060
Cash derived from subscriptions to additional common stock set aside as a construction fund	2,804,804	9,088,980 (d)	6,284,176
In addition the Company had investments in stocks, bonds and notes of affiliated companies carried at	68,644,318	66,691,303	1,953,015
Total Investments	$602,920,898	$598,648,999	$4,271,899
Cash and investments in U. S. Government securities	$44,452,830	$40,915,827	$3,537,003
Other railroad companies and others owed the Company	7,638,959	8,377,874 (d)	738,915
The Company had on hand fuel, rails, ties, bridge material and other supplies necessary for keeping road and equipment in good repair	10,768,775	11,649,347 (d)	880,572
Insurance Fund Reserve, other deferred assets and unadjusted debits, including items owed but not yet available to the Company	6,537,232	6,548,870 (d)	11,638
The Assets of the Company totalled	$672,318,694	$666,140,917	$6,177,777
The Company owed for materials, supplies, wages and balances to other railroad companies, and interest and rents accrued but not yet due	$21,722,962	$24,390,956 (d)	$2,667,994
Taxes accrued but not due	4,160,334	4,621,015 (d)	460,681
Operating and insurance reserves	4,061,791	4,409,171 (d)	347,380
Reserve for depreciation of equipment	31,914,428	29,553,188	2,361,240
Reserve for dividends on preferred and common stocks	5,596,400	5,100,000	496,400
Deferred liabilities, including items due to others not yet adjusted	7,794,866	7,662,247	132,619
The total of these liabilities, credits and reserves was	$75,250,781	$75,736,577 (d)	$485,796
After deducting these items from the total assets there remained net assets available for the capitalization of the Company of	$597,067,913	$590,404,340	$6,663,573
The capitalization of the Company consisted of the following:			
Funded Debt, including bonds and equipment trust obligations	$298,304,935	$301,427,262 (d)	$3,122,327
Preferred Stock, par value	60,000,000	60,000,000	.....
Common Stock, par value	129,818,560	129,138,300	680,260
Making a total capitalization of	$488,123,495	$490,565,562 (d)	$2,442,067
After deducting this capitalization from net assets there remained a surplus of	$108,944,418	$99,838,778	$9,105,640

(This surplus has, in a large measure, been reinvested in the property.)

[Advertisement]

larged and three new plants are being constructed and should commence operation during 1928.

It may fairly be said that the South is now predominant in the manufacture of furniture, tobacco and fertilizer materials, as well as cotton.

Aside from somewhat reduced crops of fruits and vegetables, as a result of unfavorable weather, agricultural conditions in the South continue to show improvement. A new interest in animal husbandry, stimulated by the location in the South of a number of establishments engaged in the making of butter, cheese and condensed milk, has brought about a substantial increase in the number of dairy and food animals on Southern farms, the number having increased by more than 1,300,000 head during the past year.

A comparison of the Southern's freight traffic last year with that of its first year of operation affords interesting evidence of the South's growth along all lines, as well as a gratifying trend toward a better balance between the activities of farm and factory. That the outstanding growth has been in the movement of raw materials from mine and forest to factory and of the factory's finished product to market is graphically shown by the accompanying charts.

TONS PER MILE OF ROAD—1927

TONS PER MILE OF ROAD—1895

Expressed in percentages the increases in 1927 over 1895 are:

Products of Agriculture and Animals	116%
Products of Forests	534%
Products of Mines	433%
Manufactures and Miscellaneous	385%

These figures illustrate the following official statement quoted from the recently published "Commercial Survey of the Southeast," issued by the Department of Commerce of the United States Government:

"That the Southeast offers opportunity for manufacture and allied commercial activities is unquestioned. As a market its importance has hardly been realized either by the Nation or by its own people but the field is promising and growing. As a region endowed withextremely favorable topography, climate, natural resources, raw materials, and labor, it should continue to experience an expanding industrialization. In this change, cotton, agriculture, and lumbering, although still remaining dominant economic factors, are no longer the only favored activities of commercial and financial groups. The diversified business resulting from a better balance between extractive activities and manufacturing is tending to put all phases of production on a more sound and stable basis."

The attention of the stockholders is invited to two statements which accompany this narrative. In the preparation of these statments an effort has been made to array(in condensed tabular form and without the use of technical terms, the statistics concerning the financial results of the year's business and the financial condition of the Company at the end of the year.

To all officers and employees who have faithfully and efficiently performed their duties during the past year the thanks of the Board of Directors again are tendered.

Respectfully submitted, by order of the Board,

FAIRFAX HARRISON,
President.

Canadian Pacific Railway Company

Forty-Seventh Annual Report

OF THE DIRECTORS OF THE CANADIAN PACIFIC RAILWAY COMPANY. YEAR ENDED DECEMBER 31ST, 1927

To the Shareholders:

The accounts of the Company for the year ended December 31st, 1927, show the following results:—

Gross Earnings		$201,145,751.85
Working Expenses (including all taxes)		161,630,180.45
Net Earnings		$ 39,515,571.40
Special Income		11,876,559.78
		$ 51,392,131.18
Deduct Fixed Charges		15,378,867.44
Surplus		$ 36,013,263.74
Contribution to Pension Fund		600,000.00
		$35,413,263.74
From this there has been charged a half-yearly dividend on Preference Stock of 2 per cent, paid October 1st, 1927	$ 2,002,971.76	
And three quarterly dividends on Ordinary Stock of 2½ per cent each, paid June 30th, 1927, October 1st, 1927, and December 31st, 1927	19,500,000.00	21,502,971.76
		$13,910,291.98
From this there has been declared a second half-yearly dividend on Preference Stock of 2 per cent, payable March 31st, 1928	$ 2,002,971.76	
And a fourth quarterly dividend on Ordinary Stock of 2½ per cent, payable March 31st, 1928	6,500,000.00	8.502,971.76
Leaving net surplus for the year		$ 5,407,320.22

Special Income for Year Ended December 31st, 1927

Net Revenue from Investments and Available Resources Exhibit "C"	$ 3,198,275.00
Interest on Deposits, and Interest and Dividends on Other Securities	2,932,826.20
Net Earnings, Ocean and Coastal Steamship Lines	2,442,129.18
Net Earnings, Commercial Telegraph and News Departments, Hotels, Rentals and Miscellaneous	3,303,329.40
	$11,876,559.78

Earnings and Expenses

The working expenses for the year, including all taxes, amounted to 80.36 per cent of the gross earnings, and the net earnings to 19.64 per cent, as compared with 77.30 per cent and 22.70 per cent respectively in 1926. Excluding taxes, the ratio of working expenses to gross earnings was 77.87 per cent. and in 1926, 74.41 per cent.

Gross earnings increased $3,120,160 over those of the previous year, and working expenses $8,549,716. The net earnings, before deducting fixed charges, exclusive of Special Income, were $39,515,571, or a decrease under the previous year of $5,429,555.

The results of the year's operations can scarcely be considered satisfactory due to the heavy increase in working expenses and would have been substantially better had it not been for the decreases in rates on grain made effective during the Summer and increased wages to all classes of employees granted during the year. The major increases in expenses were in Maintenance of Way and Structures, $2,339,000; Maintenance of Equipment, $2,571,000, and in Transportation, $3,219,000. Your Directors have steadily adhered to the policy of maintaining the property of the Company in the highest possible state of efficiency.

[ADVERTISEMENT]

The results for the year give further evidence of the need for increases in transportation revenues if gross earnings are to keep pace with operating costs.

Division of Expenses

Of the total expenses of the Company in railway operations during the past year, 59.05 per cent were attributable to labor costs; 26.25 per cent to cost of material for maintenance of way, equipment and miscellaneous supplies; 11.15 per cent. to the cost of fuel and locomotive supplies, and 3.09 per cent to taxes. Loss and Damage claims amounted to only .46 per cent. of the total expenses.

Special Income

The special income of the Company shows an increase over that of the previous year of $820,000, due principally to larger earnings of ocean and coastal services and increased dividends from the Consolidated Mining and Smelting Company. The special income has been added to the summary of the accounts in order to show the gross result before the deduction of fixed charges and dividends.

Land Sales

The sales of agricultural lands for the year were 430,368 acres for $5,111,797.51, being an average of $11.88 per acre. Included in this area were 10,951 acres of irrigated land which brought $46.65 per acre, so that the average for the balance was $10.97 per acre.

Issue of Additional Common Stock

Pursuant to the authorization given at the last Annual Meeting, the Directors of the Company decided to issue 400,000 shares of additional Ordinary Capital Stock, of which 325,000 shares were offered for subscription by shareholders at the price of $150 per share, and 50,000 shares were offered for subscription by the officers and employees of the Company at the same price. As the applications for stock by officers and employees exceeded by 6,290 shares the amount offered, your Directors decided to increase the number of shares available for this purpose to 56,290 shares. The remaining 18,710 shares will be disposed of in the market when conditions warrant such disposal.

Hotels

The extension to the Banff Springs Hotel will be completed in May of this year, and the work of construction of the Royal York Hotel at Toronto is proceeding satisfactorily.

Your Directors, after discussion with the National Railways and upon the strong recommendation of the latter, agreed to subscribe for $100,000 of the Preferred Stock in the Lord Nelson Hotel at Halifax, Nova Scotia, the National Railways undertaking to recommend the Government's approval of a subscription by that Company of $250,000 of such stock. This arrangement was not given effect to owing to Government objection, and your Company was pressed to increase its subscription to $350,000. Your Directors considered that, in view of your ownership of the Dominion Atlantic Railway serving the important tourist centres of the Evangeline country and connecting through the Eastern Steamship Company with the Port of Boston, the local project, which received general support in Halifax, should be assisted to the extent mentioned. The subscription was accompanied by an offer to the National Railways to transfer to that Company or the Government $250,000 of the Preferred Stock at cost up to July 1st next—in other words, renewing the proposal made by the National Company to this Company. The National Railways shortly afterward announced the construction of a hotel by that Company. Your Directors deplore this duplication as entirely without justification and are continuing negotiations with the National System in the hope that a way may be found of avoiding it.

Canadian Pacific Steamships Limited

The year 1927 showed a decrease in revenue on the Atlantic and an increase on the Pacific, with the result that the net earnings of the entire fleet were moderately increased.

During the year the S.S. "Bawtry" was disposed of.

In order to provide for the replacement of vessels, the age or type of which rendered them no longer suitable for North Atlantic service, your Directors authorized the construction by Messrs. John Brown and Company of two first class 18 knot twin screw geared turbine oil burning passenger and cargo steamships, to be delivered in January and March, 1929.

Your Directors are of the opinion that an additional vessel should be ordered for the Pacific service and another first class vessel for the Quebec-Southampton service.

You will be asked to aprove resolutions confirming the action of the Directors and authorizing the construction of the four vessels and the issuance of Consolidated Debenture Stock to defray the expense.

Branch Lines

During the past year the construction of branch lines which you had authorized in Western Canada was produced with, 203 miles being graded, 170.9 miles of track being laid and 108.3 miles ballasted on lines in the process of construction.

Your Directors are of the opinion that further extensions should be built as conditions warrant and your authority will be asked for proceeding with the construction and for the issue of Consolidated Debenture Stock in aid of the following lines, namely:—

1.	Swift Current Northwesterly Branch (Alberta), Willingdon to Edmonton	70.0 miles
2.	Moose Jaw Southwesterly Branch (Saskatchewan), Mileage 109 to 146	37.0 miles
3.	Aikins Northerly Branch (Saskatchewan), Mileage 0 to 20	20.0 miles
4.	Hatton Northeasterly Branch (Saskatchewan), Mileage 0 to 18	18.0 miles
5.	Leader Southerly Branch (Saskatchewan), Pennant southwesterly	24.0 miles
6.	Fife Lake Branch (Saskatchewan), Mileage 43 to 63	20.0 miles
7.	Archive - Wymark Branch (Saskatchewan), Mileage 62 to 74	12.0 miles
8.	Unwin Westerly Branch (Saskatchewan-Alberta), Mileage 0 to 20	20.0 miles
9.	Rosetown Northerly Branch (Saskatchewan), Mileage 21 to 45	24.0 miles
10.	Gem Colony Branch (Alberta), Mileage 8.5 to 11	2.5 miles

It is also proposed to construct a branch of the Alberta Railway and Irrigation Company's railway from Woolford Southeasterly a distance of 13 miles. The A. R. & I. Company has authority to issue Bonds not exceeding $40,000 per mile which will, in the usual course, be acquired by this Company with the proceeds of the sale of Consolidated Debenture Stock to be issued for the purpose.

During the year your Directors purchased the abandoned railway of the Hereford Railway Company constructed from the Vermont line near Beecher Falls to Lime Ridge, Que., a distance of fifty-three miles, for the sum of $46,378. It was a term of the purchase that only the line between Cookshire and Malvina, 22.48 miles, should be operated, the remainder to be dismantled.

Subject to necessary statutory authority being obtained, your Directors have also agreed to purchase from the Government of the Province of Alberta the railway and capital stock of the Lacombe and North Western Railway Company, constructed from Lacombe northwesterly to Breton, Alberta, a distance of 71.56 miles, for the sum of $1,500,000, the Company to indemnify the Province against future liability on its guarantee of the outstanding First Mortgage Five per Cent Bonds of the Lacombe and North Western Railway Company, aggregating $273,700, and to undertake to extend the line to Telfordville, a distance of 20 miles. Your approval of these transactions and your authority for the issue of Consolidated Debenture Stock to aid in financing them will be asked for.

Agreements and Leases

Your confirmation and approval will be asked of the following agreements and leases made by your Directors during the past year:

(1) Lease dated August 1, 1927, whereby the St. Johnsbury and Lake Champlain Railroad Company leased to the Company that part of its railway between St. Johnsbury and Lunenburg, Vermont, for the term of ten years from August 1, 1927, at the annual rental of Twenty-five Thousand Dollars, and an underlease of the same property to the Maine Central Railroad Company for the same term at the same rental.

(2) Agreement dated 13th June, 1927, between the Company and the Canadian National Railway Company, whereby the Company acquired the right to use that part of the Canadian National line between Knee Hill and Rosedale, Alberta, on the basis of paying one-half the interest charge on Capital Account and a wheelage proportion, with a minimum of 20%, of the maintenance and operation expense.

(3) Agreement dated 13th June, 1927, between the Company and the Canadian National Railway Company, whereby

[Advertisement]

Canadian Pacific Railway Company—General Balance Sheet, December 31, 1927

GENERAL BALANCE SHEET, DECEMBER 31ST, 1927

ASSETS

PROPERTY INVESTMENT:		
Railway, Rolling Stock Equipment and Lake and River Steamers		$686,387,126.48
OCEAN AND COASTAL STEAMSHIPS, Exhibit "A"		76,591,843.85
ACQUIRED SECURITIES (COST): Exhibit "B"		145,710,386.78
ADVANCES TO CONTROLLED PROPERTIES AND INSURANCE PREMIUMS		12,545,815.90
INVESTMENTS AND AVAILABLE RESOURCES:		
Deferred Payments on Lands and Townsites	$54,739,614.95	
Provincial and Municipal Securities	792,721.29	
Miscellaneous Investments, Exhibit "C," Cost	25,972,592.60	
Assets in Lands and Properties, Exhibit "D"	86,709,784.04	
		168,214,712.88
WORKING ASSETS:		
Material and Supplies on Hand	$22,412,981.17	
Agents' and Conductors' Balances	5,230,783.21	
Net Traffic Balances	1,679,677.36	
Imperial, Dominion and United States Governments, Accounts due for Transportation, etc.	1,227,295.19	
Miscellaneous Accounts Receivable	7,328,668.10	
Cash in Hand	41,968,662.79	
		79,848,067.82
		$1,169,297,953.71

GENERAL BALANCE SHEET, DECEMBER 31ST, 1927

LIABILITIES

CAPITAL STOCK:			
Ordinary Stock		$260,000,000.00	
Payments on Subscription to New Issue Ordinary Stock ($40,000,000.00)		34,002,549.37	
Four Per Cent Preference Stock		100,148,587.78	
			$394,151,137.15
FOUR PER CENT CONSOLIDATED DEBENTURE STOCK	$304,244,882.08		
LESS: Collateral as below*	40,000,000.00		
			264,244,882.08
TEN YEAR 5% COLLATERAL TRUST GOLD BONDS (1934)*			12,000,000.00
TWENTY YEAR 4½% COLLATERAL TRUST GOLD BONDS (1946)*			20,000,000.00
TWENTY YEAR 4½% SINKING FUND SECURED NOTE CERTIFICATES (1944)	30,000,000.00		
LESS: Purchased by Trustee and cancelled	3,515,400.00		
	26,484,600.00		
LESS: Amount held by Trustee	149,520.94		26,335,079.06
MORTGAGE BONDS: Algoma Branch 1st Mortgage 5 per cent			3,650,000.00
CURRENT:			
Audited Vouchers		7,847,871.69	
Pay Rolls		3,985,134.13	
Miscellaneous Accounts Payable		5,265,400.30	
			17,098,406.12
ACCRUED: Rentals of Leased Lines and Coupons on Mortgage Bonds			1,006,099.51
EQUIPMENT OBLIGATIONS			15,470,000.00
RESERVES AND APPROPRIATIONS:			
Equipment Replacement		1,157,502.37	
Steamship Replacement		16,130,715.20	
Reserve Fund for Contingencies and for Contingent Taxes		23,112,239.36	
			40,400,456.93
PREMIUM ON ORDINARY CAPITAL STOCK SOLD:			
LESS: Discount on Collateral Trust Gold Bonds and Note Certificates			40,278,965.22
NET PROCEEDS LANDS AND TOWNSITES			73,721,856.74
SURPLUS REVENUE FROM OPERATIONS			143,796,822.37
SPECIAL RESERVE TO MEET TAXES IMPOSED BY DOMINION GOVERNMENT			2,059,360.68
SURPLUS IN OTHER ASSETS			115,084,887.85
			$1,169,297,953.71

J. LESLIE,
Vice-President and Comptroller.

provision is made for the construction by this Company of a line to be jointly owned and used by both Companies between Rosedale and Bull Pound Creek, Alberta, the Canadian National to reimburse this Company for one-half of all capital expenditures, and to pay a car mileage proportion, with a minimum of 20%, of the maintenance and operation expense.

(4) Agreement dated 21st February, 1928, between the Company and the Canadian National Railway Company, whereby the Company obtained the right to use that part of the line of the Canadian National between a point near Port McNicoll and its terminus in the Town of Midland, Ontario on the basis of paying one-half the interest charge and a wheelage proportion, with a minimum of 20%, of the maintenance and operation expense.

Bridges

During the past few years substantial progress has been made in the renewal of bridges in order to meet the increasing weight of power and equipment. During 1928 your Directors propose to continue this policy and to incur an expenditure of approximately $1,332,000 in replacement of bridges, principally on the Mountain and Oshawa Subdivisions.

Minneapolis, St. Paul and Sault Ste. Marie Railway Company

The results of the operations of your subsidiary, the Minneapolis, St. Paul and Sault Ste. Marie Railway Company, (including the Wisconsin Central), showed a distinct improvement over 1926, and notwithstanding that the Wisconsin Central showed a loss of $478,000, the net gain for last year was $1,541,000. The unsatisfactory showing of the Wisconsin Central during the latter half of the year was due to general recession in business. Crop conditions in quite a large portion of the territory served by the Soo Line proper were below the average, but the benefit of the work done in the last few years in diversity of farming was felt. The properties of these railways have been well maintained and better results are looked for in the future.

Capital Expenditures

In anticipation of your confirmation, your Directors authorized capital appropriations, in addition to those approved at the last Annual Meeting, aggregating for the year 1927, $3,733,443, and ask your approval of expenditures on capital account during the present year of $10,940,357. Of this amount the principal items are:—

Replacement and enlargement of structures in permanent form	$ 654,024
Additional stations, round houses, freight sheds and shops, and extensions to existing buildings	1,300,086
Tie plates, rail anchors, ballasting, ditching and miscellaneous roadway betterments	2,152,225
Replacement of rail in main and branch line tracks with heavier section	1,623,793
Additional terminal and side track accommodation	1,393,092
Improving coaling and watering facilities	266,605
Mechanical Department, machinery at various points	530,513
Improvements in connection with Telegraph Service	1,123,991
British Columbia Lake and River Steamers	49,000
British Columbia Coast Steamships	21,700

The balance of the amount is required for miscellaneous works to improve facilities and effect economies over the whole System.

Stock Holdings

The position of the holdings of the Common Stock of the Company at the end of the fiscal year just closed was as follows:—

United Kingdom	48.84%
Canada	18.02%
United States	26.20%
Other countries	6.94%

Death of Mr. Hosmer

Your Directors regret to report the death on November 14th, 1927, of Mr. Charles R. Hosmer, who had been a member of the Board for twenty-eight years and of the Executive Committee since May, 1925. Mr. W. A. Black was elected a Director to fill the vacancy occasioned by Mr. Hosmer's death and Mr. F. W. Molson was elected a member of the Executive Committee.

Retiring Directors

The undermentioned Directors will retire from office at the approaching Annual Meeting. They are eligible for re-election:—

MR. GRANT HALL
SIR VINCENT MEREDITH, BART.
MR. E. R. PEACOCK
MR. W. N. TILLEY, K. C.

For the Directors,

E. W. BEATTY, *President.*

Montreal, March 12th, 1928.

[ADVERTISEMENT]

Southern Pacific Company -- Report of the Board of Directors

NEW YORK, N. Y., March 22, 1928.

TO THE STOCKHOLDERS OF THE SOUTHERN PACIFIC COMPANY:

Your Board of Directors submits this report of the operations and affairs of the Southern Pacific Lines and Affiliated Companies for the fiscal year ended December 31, 1927.

Income Account

The following statements of income and of surplus show the income for the year and the accumulated surplus to the close of the year, accruing to Southern Pacific Company stock from the transportation System and from all *separately operated Solely Controlled Affiliated Companies,* combined:

NET INCOME OF THE SOUTHERN PACIFIC LINES AND SOLELY CONTROLLED AFFILIATED COMPANIES, COMBINED, FOR THE YEAR 1927 COMPARED WITH THE YEAR 1926

	Year Ended December 31, 1927	Decrease Compared with 1926 Amount	Per Cent
1. Net income of Transportation System	*$33,702,524.47	$5,088,849.03	13.12
2. Net income of Affiliated Companies	*2,296,672.34	946,618.91	29.19
3. Net income of Transportation System and of all separately operated Solely Controlled Affiliated Companies, combined.	*$35,999,196.81	$6,035,467.94	14.36
4. Per cent. earned on average amount of outstanding capital stock of Southern Pacific Company:			
(a) From operations of Transportation System	9.05	1.37	13.15
(b) From operations of Affiliated Companies	.62	.25	28.74
(c) Total for the year 1927	9.67	1.62	14.35
(d) Total for the year 1926	11.29	—	—

* Excludes all inter-company dividends.

SURPLUS OF THE SOUTHERN PACIFIC LINES AND SOLELY CONTROLLED AFFILIATED COMPANIES, COMBINED, TO DECEMBER 31, 1927

		Debit	Credit
1. Total corporate surplus at December 31, 1926		—	$467,111,211.59
2. Credit balance transferred from income: Transportation System	$32,136,343.84		
Affiliated Companies	2,266,582.34	—	34,402,926.18
3. Dividends paid: On capital stock of Southern Pacific Company:			
1½ per cent. paid April 1, 1927	$ 5,585,713.50		
1½ per cent. paid July 1, 1927	5,585,713.50		
1½ per cent. paid October 1, 1927	5,585,713.50		
1½ per cent. payable January 3, 1928	5,585,713.50		
Total Southern Pacific Company	$22,342,854.00		
On capital stocks of Transportation System Companies held by the public	75.00	$22,342,929.00	
4. Miscellaneous adjustments during the year		—	1,015,681.85
5. Credit balance December 31, 1927		480,186,890.62	
		$502,529,819.62	$502,529,819.62

Income Account of Southern Pacific Lines

The income account of the Transportation System (Southern Pacific Company and Transportation System Companies, combined, excluding offsetting accounts and inter-company dividends) for the year 1927, compared with the year 1926, was as follows, viz:

OPERATING INCOME

	Year Ended December 31, 1927	+ Increase — Decrease	Per Cent.
1. Railway operating revenues	$297,745,406.16	—$1,055,591.90	.35
2. Railway operating expenses	218,179,192.32	+ 2,583,712.05	1.20
3. Net revenue from railway operations	$79,566,213.84	—$3,639,303.95	4.37
4. Railway tax accruals	21,213,512.35	— 263,298.30	1.23
5. Uncollectible railway revenues.	132,123.69	+ 51,300.64	63.47
6. Equipment rents—Net	6,359,887.95	+ 723,160.53	12.83
7. Joint facility rents—Net	256,621.57	+ 42,182.67	19.67
8. Net railway operating income	$51,604,068.28	—$4,192,649.49	7.51
NONOPERATING INCOME			
9. Income from lease of road	$95,581.95	+ $265.80	.28
10. Miscellaneous rent income	1,777,254.39	+ 252,418.25	16.55
11. Miscellaneous nonoperating physical property	104,179.32	— 156,781.38	60.08
12. Dividend income	†3,936,023.10	+ 940,226.88	31.38
13. Income from funded securities—Bonds and notes	2,859,713.98	— 261,463.97	8.38
14. Income from funded securities—Investment advances	40,528.60	— 29,668.42	42.26
15. Income from unfunded securities and accounts	832,760.08	— 1,441,203.78	63.38
16. Income from sinking and other reserve funds	1,005,168.98	+ 11,591.95	1.17
17. Miscellaneous income	406,064.46	— 165,133.11	28.91
18. Total nonoperating income	$11,057,274.86	— $849,747.78	7.14
19. Gross income	$62,661,343.14	—$5,042,397.27	7.45
DEDUCTIONS FROM GROSS INCOME			
20. Rent for leased roads	$250,627.96	+ $8,523.77	3.52
21. Miscellaneous rents	789,109.92	+ 14,911.88	1.93
22. Miscellaneous tax accruals	52,087.22	— 126,644.76	70.86
23. Separately operated properties—Loss	55,934.95	+ 55,934.95	—
24. Interest on funded debt—Bonds and notes	27,107,505.82	+ 72,581.21	.27
25. Interest on funded debt—Non-negotiable debt to affiliated companies	22,465.26	+ 21,802.73	—
26. Interest on unfunded debt	203,720.94	— 24,902.84	10.89
27. Amortization of discount on funded debt	73,317.98	+ 9,106.65	14.18
28. Maintenance of investment organization	34,316.72	— 58,096.73	62.87
29. Miscellaneous income charges	369,731.90	+ 73,234.90	24.70
30. Total deductions from gross income	$28,958,818.67	+ $46,451.76	.16
31. Net income	$33,702,524.47	—$5,088,849.03	13.12
DISPOSITION OF NET INCOME			
32. Income applied to sinking and other reserve funds	$1,439,862.52	+ $26,511.66	1.88
33. Income appropriated for investment in physical property	126,318.11	— 78,523.42	38.33
34. Total appropriations	$1,566,180.63	— $52,011.76	3.21
35. Income balance transferred to credit of profit and loss	$32,136,343.84	—$5,036,837.27	13.55

† Excludes all inter-company dividends.

The operating income of the Transportation System is dealt with further on under the heading "Transportation Operations —Southern Pacific Lines." The causes of the principal increases and decreases in nonoperating income and in deductions from gross income are explained below, viz:

NONOPERATING INCOME

Of the increase of $252,418.25 in the account Miscellaneous Rent Income, $97,600 is the result of including in that account, this year, the rentals from certain transportation property, which last year were included in Miscellaneous Nonoperating Physical Property; the remainder being due, principally, to a credit to that account this year of rentals accruing in prior years.

Of the decrease of $156,781.38 in the account Miscellaneous Nonoperating Physical Property, $97,600 is due to the inclusion in that account, last year, of rents for transportation property, which this year are included in Miscellaneous Rent Income, as explained in the paragraph next above; the remainder of the decrease being due, principally, to a decrease in rentals received from industrial concerns.

The increase of $940,226.88 in the account Dividend Income, is the result of increased dividends received from Reward Oil Company, Standard Oil Company of California, and Pacific Fruit Express Company, amounting to $1,341,898.88, which increase was partly offset by a decrease of $401,672.00 in dividends received from other companies.

The decrease of $261,463.97 in the account Income from Funded Securities—Bonds and Notes, is due, principally, to the sale during the year to the public, and to sinking funds, of bonds of other companies held in the treasury.

The decrease of $1,441,203.78 in the account Income from Unfunded Securities and Accounts, is due, principally, to large credits last year to interest on Company's own funds used for construction on account of work that was completed last year, and to a decrease in interest received on demand and time loans.

The decrease of $165,133.11 in the account Miscellaneous Income, is due, principally, to decreased royalties received on oil and gas from wells located on transportation property in the Spindletop and Wortham, Texas, fields.

DEDUCTIONS FROM GROSS INCOME

Of the decrease of $126,644.76 in the account Miscellaneous Tax Accruals, about $115,000 represents taxes charged, this year, to Railway Tax Accruals, on property which last year was

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carried in the account Miscellaneous Physical Property, but which this year was transferred to Investment in Road and Equipment.

The increase of $72,581.21 in the account Interest on Funded Debt—Bonds and Notes, is due to an increase of $565,327 representing interest accrued on the $20,000,000 of Southern Pacific Company Oregon Lines First Mortgage Four and One-Half Per Cent. Bonds, Series A, and on the $5,786,000 Four and One-Half Per Cent. Southern Pacific Equipment Trust Certificates, Series J, issued during the year; to an increase of $106,012.50 representing the difference between a full year's interest this year and the interest accruing last year on $5,654,000 of Southern Pacific Equipment Trust Certificates, Series I, sold in June, 1926; and to an increase of $41,743.77 representing the increase in interest on bonds of Transportation System Companies held in sinking funds; less a decrease of $447,300 on account of $15,926,000 Oregon & California First Mortgage Five Per Cent. Bonds held by public retired during the year; a decrease of $157,556.01 on account of Southern Pacific Equipment Trust Certificates maturing during the year which were paid off; a decrease of $27,981.05 on account of other bonds of Southern Pacific Company and Transportation System Companies retired during the year, principally by sinking funds; and to a decrease of $7,665 representing interest accruing last year on the balance of $511,000 of Equipment Trust Certificates, Series D, which were paid off last year.

The decrease of $58,096.73 in the account Maintenance of Investment Organization, is caused, principally, by the inclusion in that account last year, of expenses incurred in prior years but paid last year in connection with the Oregon & California Railroad land grant controversy.

The increase of $73,234.90 in the account Miscellaneous Income Charges, is due, principally, to an increase in this Company's proportion of the annual charge for amortization of investment in Associated Pipe Line, the said charge being apportioned among the three owning companies (Associated Oil Company, Standard Oil Company of California, and Southern Pacific Company) on the basis of use of the pipe line.

The dividends paid for 1927 were appropriated from the profit and loss surplus and, therefore, do not appear in the income account. Payments for 1927 amounted to $22,342,929.00, compared with $22,343,004.32 for 1926. The figures for this year include $75.00 and those for last year $150.00, representing dividends on stocks of Transportation System Companies held by the public.

15. Miscellaneous operations	5,198,737.89	+	201,551.59	4.03
16. General	11,277,449.46	+	488,682.72	4.53
17. Transportation for investment—Credit	*1,274,608.37*	+	510,330.18	28.59
18. Total railway operating expenses	$218,179,192.32	+	$2,583,712.05	1.20
19. Net revenue from railway operations	$79,566,213.84	—	$3,639,303.95	4.37
20. Railway tax accruals	$21,213,512.35	—	$263,298.30	1.23
21. Uncollectible railway revenues	132,123.69	+	51,300.64	63.47
22. Railway operating income	$58,220,577.80	—	$3,427,306.29	5.56
23. Equipment rents—Net	6,359,887.95	+	723,160.53	12.83
24. Joint facility rents—Net	256,621.57	+	42,182.67	19.67
25. Net railway operating income	$51,604,068.28	—	$4,192,649.49	7.51

TRAFFIC STATISTICS
(STEAM RAIL LINES)

FREIGHT TRAFFIC				
26. Freight service train-miles	27,647,266	+	965,539	3.62
27. Tons carried—revenue freight	59,546,561	+	389,936	.66
28. Ton-miles—revenue freight	15,133,358,240	+	408,665,378	2.78
29. Loaded cars per train	27.67	—	.25	.90
30. Net tons per train—all freight	619.39	—	9.58	1.52
31. Revenue per ton-mile—revenue freight	1.368 cents	—	.033 cents	2.36
32. Average distance carried—revenue freight	254.14	+	5.23	2.10
PASSENGER TRAFFIC				
33. Passenger service train-miles	27,318,270	+	507,707	1.89
34. Passengers carried—revenue	13,903,477	—	381,082	2.67
35. Passenger-miles—revenue	1,805,706,891	—	32,228,450	1.75
36. Passengers per train—revenue passengers	64.33	—	2.46	3.68
37. Passenger revenue per passenger-mile	2.817 cents	—	.049 cents	1.71
38. Average distance carried—revenue passengers	129.87	+	1.20	.93

The following tabulation gives the transportation operations for the years 1922, 1923, 1924, 1925, 1926, and 1927, compared with the year 1917, the last year prior to Federal control, and with 1921, the first complete year subsequent to Federal control, the figures being given in round thousand dollars:

	1927	1926	1925	1924	1923	1922	1921	1917
Operating revenues	$297,745	$298,801	$295,102	$291,727	$287,205	$262,519	$269,494	$193,971
Per cent. of 1917	153.50	154.04	152.14	150.40	148.07	135.34	—	—
Per cent. of 1921	110.48	110.87	109.50	108.25	106.57	97.41	—	—
Operating expenses	$218,179	$215,595	$217,762	$214,812	$207,167	$193,664	$212,572	$120,601
Per cent. of 1917	180.91	178.77	180.56	178.12	171.78	160.58	—	—
Per cent. of 1921	102.64	101.42	102.44	101.05	97.46	91.11	—	—
Operating ratio	73.28	72.15	73.79	73.63	72.13	73.77	78.88	62.17
Net revenue from railway operations	$79,566	$83,206	$77,340	$76,915	$80,038	$68,855	$56,922	$73,370
Per cent. of 1917	108.44	113.41	105.41	104.83	109.09	93.85	—	—
Per cent. of 1921	139.78	146.18	135.87	135.12	140.61	120.96	—	—
Railway tax accruals	$21,214	$21,477	$21,340	$20,909	$20,365	$18,859	$15,539	$13,792
Per cent. of 1917	153.81	155.72	154.73	151.60	147.66	136.74	—	—
Per cent. of 1921	136.52	138.21	137.33	134.56	131.06	121.37	—	—
Net railway operating income	$51,604	$55,797	$50,043	$50,475	$54,228	$46,223	$35,947	$62,253
Per cent. of 1917	82.89	89.63	80.39	81.08	87.11	74.25	—	—
Per cent. of 1921	143.56	155.22	139.21	140.42	150.86	128.59	—	—
Traffic units (ton-miles plus three times passenger-miles)—millions	22,908	22,679	22,584	21,929	21,044	18,012	17,451	20,877
Per cent. of 1917	109.73	108.63	108.18	105.04	100.80	86.28	—	—
Per cent. of 1921	131.27	129.96	129.41	125.66	120.59	103.21	—	—

Transportation Operations—Southern Pacific Lines

The following table shows the Net Railway Operating Income and Traffic Statistics of the Transportation System for the year 1927 compared with those for the year 1926:

	Year Ended December 31, 1927	+ Increase — Decrease	Per Cent.
1. Average miles of road operated	13,504.85	+ 225.16	1.70
NET RAILWAY OPERATING INCOME			
RAILWAY OPERATING REVENUES			
2. Freight	$216,616,634.04	— $9,130.41	—
3. Passenger	53,240,928.29	— 2,021,401.96	3.66
4. Mail and express	11,756,750.82	+ 322,745.80	2.82
5. All other transportation	9,412,125.78	+ 356,541.23	3.94
6. Incidental	7,612,405.70	+ 228,707.14	3.10
7. Joint facility—Credit	398,650.20	— 20,027.45	4.78
8. Joint facility—Debit	*1,292,088.67*	+ 86,973.75	6.31
9. Total railway operating revenues	$297,745,406.16	—$1,055,591.90	.35
RAILWAY OPERATING EXPENSES			
10. Maintenance of way and structures	$40,972,090.31	—$1,492,272.04	3.51
11. Maintenance of equipment	50,731,306.64	+ 93,730.68	.19
12. Total maintenance	$91,703,396.95	—$1,398,541.36	1.50
13. Traffic	6,785,542.58	+ 425,965.02	6.70
14. Transportation	104,488,673.81	+ 2,355,723.90	2.31

As has been stated in reports for previous years, the Transportation Act of 1920 provides that the railways shall receive a fair return upon the aggregate value of railway property held for and used in the service of transportation, such fair return being 5¾ per cent., as last fixed by the Interstate Commerce Commission under authority of the Act. Notwithstanding a steady increase in the volume of traffic handled, and the marked gain in operating efficiency as reflected in net revenue from railway operations, the existing rate structure, during each year since enactment of the Transportation Act, has failed to give your Company the fair return contemplated by the Act. The relationship of net railway operating income to the book value of road and equipment of the lines constituting your Transportation System, has been as follows:

1921	3.36%
1922	4.29%
1923	4.81%
1924	3.99%
1925	3.77%
1926	3.98%
1927	3.59%
Average for 7 years	3.97%

The total Railway Operating Revenues for 1927, amounting to $297,745,406.16, were not as large as had been expected. During the first half of the year, notwithstanding the disastrous floods in the Mississippi Valley and other adverse conditions, the results showed substantial gains over the corresponding period of 1926, but these gains were more than overcome by losses due to the general slowing up of business during the last half of the year, to a shortage in the 1927 cotton crop, and to the increasing inroads of automobile competition into both

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the passenger and the freight business of your lines. Even under these adverse conditions, the operating revenues for the year were only $1,055,592, or 35 hundredths of one per cent., less than 1926, which was the peak year in the history of your Company.

The decrease of $1,055,592 in Railway Operating Revenues was accompanied by (a) an increase of $2,583,712 in Railway Operating Expenses (about $2,000,000 of which represented increases in wage rates awarded by U. S. Arbitration Boards without any corresponding increase in transportation rates), (b) a decrease of $263,298 in Railway Tax Accruals, and (c) increases aggregating $816,644 in equipment and joint facility rents and other charges, the result being a decrease of $4,192,650 in Net Railway Operating Income.

During 1927 your Company moved 15,133,358,240 ton-miles of revenue freight. This was the largest amount ever handled in the Company's history, exceeding the peak year of 1926 by 408,665,378 ton-miles, or 2.78 per cent. Notwithstanding this large increase in the ton-miles of freight, however, there was a nominal decrease in freight revenues of $9,130, an increase on the Pacific Lines being more than offset by decreases on the Texas and Louisiana Lines and on the Southern Pacific Steamship Lines. This increase in ton-miles, with a decrease in freight revenue, was due to an increased movement of heavy, low rate, or medium-rate tonnage, principally a large increase in the tonnage of sand and gravel, and a long haul of crude oil, augmented by a decreased movement of light weight, high-rate tonnage, such as cotton, automobiles, and less than car load freight.

On the Pacific Lines, freight revenue for the first half of 1927 showed substantial gains from the increased movement of agricultural products, principally perishables, such as oranges, lettuce, and other fresh fruits and vegetables. Increases were also shown in such important commodities as barley, rice, nuts, canned goods, cement, cattle, coal, sand, and gravel, which were partly offset by decreases in forest products due to general decline in building activity; in cotton due to short crops; in sugar due to a record Cuban crop in 1926 and to canal competition; and in less than car load shipments, due to automobile competition; the result being an increase of $1,808,000 over the first half of 1926. During the last half of 1927, however, a general slowing up of business caused a loss in freight revenue of $245,000, compared with the corresponding period of 1926, the result for the year being a net increase of $1,563,000, or 1.02 per cent.

On the Texas and Louisiana Lines, there was an increase in freight revenue during the first half of 1927 of $802,000. This was due, principally, to an increased movement of cotton on account of the carry over stock which failed to move in the previous year because of the low price of cotton; and to an increased movement of fresh fruits and vegetables from the Rio Grande Valley and of crude oil from the McCamey field, the revenues from practically all other classes of commodities showing decreases, due to loss of traffic on account of the Mississippi Valley floods. The gain in the first half of the year was more than overcome, however, by a loss of $1,709,000 in the last half of the year. Of this loss, about $950,000 was due to a shortage in the Texas cotton crop, and the remainder to the loss of traffic resulting from the Mississippi Valley floods and from the general slowing up of business during the last six months of the year. The operations for the year, therefore, showed a net decrease in freight revenue of $907,000, or 1.68 per cent.

On the Southern Pacific Steamship Lines, freight revenue for the year decreased $664,800, or 6.54 per cent., resulting from loss of traffic due to the Mississippi Valley floods, and to the general slowing up of business throughout the country which was particularly noticeable in Southern states where purchasing power was curtailed by the low prices obtained for the 1926 cotton crop.

Passenger Revenue decreased $2,021,402, or 3.66 per cent., of which $1,149,815 allocated to the Pacific Lines, $864,623 to the Texas & Louisiana Lines, and $6.964 to the Southern Pacific Steamship Lines. Although passenger traffic was adversely affected by the Mississippi Valley floods and by the general slowing up of business in the last half of the year, the decreases for the rail lines shown were due almost entirely to the more extensive use of private automobiles for travel, and to motor coach and other automobile competition which, with better equipment and by the improvement of service through consolidation and coordination, is becoming each year a greater competitive factor.

The following tabulation, giving for the past four years the fluctuations in gross passenger revenue, contrasted with the fluctuations in gross revenues other than passenger, indicates the effect which automobile competition is having on the passenger business of your lines:

	Gross Passenger Revenue		Gross Revenues Other Than Passengers	
Year	For the Year	Decrease During Year	For the Year	Increase During Year
1924	$58,818,668	*$3,340,208*	$232,908,352	$7,862,593
1925	56,292,247	*2,526,421*	238,809,507	5,901,155
1926	55,262,330	*1,029,917*	243,538,668	4,729,161
1927	53,240,928	*2,021,402*	244,504,478	965,810
Average per Year	55,903,543	*2,229,487*	239,940,251	4,864,680

Gross revenues other than passenger shows an average increase per year for the four years of $4,864,680. This represents a steady increase up to the time of the general slowing up of business, commencing about the middle of 1927, which, ordinarily, would indicate that there should be a corresponding proportionate increase in passenger revenue. As will be seen, however, passenger revenue, instead of increasing, has shown a steady decline, decreasing from $62,158,876 in 1923 to $53,240,928 in 1927, or, an average decrease of $2,229,487 per year. As indicated in the annual reports for the years under consideration, this decline is due, chiefly, to the increasing inroads of automobile competition. To meet this condition, and to effect certain economies in train service, your Company caused the incorporation, in April, 1927, of the Southern Pacific Motor Transport Company, which matter is fully dealt with in another part of this report.

All Other Transportation Revenue increased $356,541, or 3.94 per cent., due, principally, to an increase in automobile ferry traffic at San Francisco, to increased switching on the Texas and Louisiana Lines, and to more commercial trips of, and to increased rates obtained by, tank steamers of the Southern Pacific Steamship Lines for the transportation of commercial oil.

Incidental Revenue increased $228,707, or 3.10 per cent., due, mainly, to revenues from train vending operations taken over by this Company, during the year, from a private company; to an increase in dining buffet service revenue; and to revenue derived from other companies for the use of your Company's lines in detouring trains in the flood districts of Louisiana.

Maintenance of Way and Structures decreased $1,492,272, or 3.51 per cent. This decrease was the result of including in operating expenses last year, as explained in last year's report, large expenditures for bringing certain portions of your line up to main line standard, to fit them for use as a part of through traffic routes established through the construction of new lines. This decrease does not indicate any curtailment of the up-keep program, the property having been maintained quite up to the Company's usual high standard, as will be seen by reference to the following table giving the principal items of material used in repairs and renewals during the past six years:

	Material Used in Repairs and Renewals					
	1927	1926	1925	1924	1923	1922
New steel rail, track miles	536.82	510.14	349.09	403.32	458.12	287.21
Ties, number	4,431,318	4,832,239	4,767,408	3,973,715	3,971,158	4,024,967
Ties, number per mile	225	248	252	222	245	251
Tie-plates, number	6,442,358	7,516,596	6,162,239	5,485,332	5,390,530	4,084,974
Piling, lineal feet	403,417	489,580	883,017	766,208	825,745	608,467
Lumber, feet b.m.	24,057,955	27,528,359	37,661,011	32,023,097	26,463,926	27,842,532

Maintenance of Equipment increased $93,731, or .19 per cent.

Traffic Expenses increased $425,965, or 6.70 per cent., due, principally, to increases in the expenses of outside agencies, and to increased expenditures for advertising, to obtain our share of competitive traffic.

Transportation Expenses increased $2,355,724, or 2.31 per cent. Of this increase higher wage rates were responsible for $1,200,000, the remainder being due, principally, to increased transportation service resulting from the increased ton-miles of traffic handled.

The constant campaign carried on for years to reduce fuel consumption in locomotives, has been reflected by a gradual but large reduction in the amount of fuel used in proportion to the ton-miles of traffic moved. The reduction in pounds of fuel used per 1,000 gross ton-miles in 1927, under 1926, amounted to .63 per cent. in passenger service, and 3.84 per cent. in freight service. The value of the economy realized in 1927 compared with 1926, amounted to $602,545, and in 1927 compared with 1913, to $11,996,044. The following table shows results obtained in fuel economy in 1927, compared with the preceding two years, and with the year 1913:

[Advertisement]

Locomotive Fuel Performance	1927	1926	1925	1913	Comparison of 1927 With 1926	1925	1913
Pounds of fuel per 1,000 gross ton-miles:							
Passenger service	125.56	126.35	141.84	206.67	—.63%	—11.48%	—39.25%
Freight service	119.88	124.67	129.23	192.83	—3.84%	— 7.24%	—37.83%
Value of fuel saved in							
1927 over 1926							$602,545
1927 over 1925							1,786,323
1927 over 1913							11,996,044

Miscellaneous Operations increased $201,552, or 4.03 per cent., due, principally, to increased dining and buffet car service, and to the expense of train vending operations taken over by the Company, during the year, from a private company.

General Expenses increased $488,683, or 4.53 per cent., the principal items being an increase of $122,000 in salaries of clerks and attendants, due, principally, to an increase in wage rates; to an increase of $142,000 in pensions; and to an increase of $130,000 in valuation expenses.

Railway Tax Accruals for the year decreased $263,298, or 1.23 per cent., the result, largely, of the repeal of the Federal Capital Stock Tax law in 1926. They consumed, however, 26.7 per cent. of Net Revenue from Railway Operations, against 25.8 per cent. in 1926.

Expenses incurred during the year on account of Federal Valuation of Railroads amounted to $1,124,553, making the total disbursements on this account from the time the work began to the close of the present year $8,525,311.

Capital Stock—Southern Pacific Lines

The decrease during the year in capital stocks of Southern Pacific Company and Transportation System Companies *held by the public* amounted to $3,550.00, as follows:

Capital stocks of Transportation System Companies, acquired from the public	$3,550.00

Funded Debt—Southern Pacific Lines

To provide for the construction and acquisition of new rolling stock, an equipment trust, known as "Southern Pacific Equipment Trust, Series J," was created, and an issue of $5,786,000, par value, of Four and One-Half Per Cent. Equipment Trust Certificates authorized, all of which were issued during the year, pursuant to authority of Interstate Commerce Commission's order dated July 18, 1927. The certificates are dated July 1, 1927; they mature serially in lots of $526,000 on July 1 of each year from 1932 to 1942, both inclusive; and have dividend warrants attached entitling the holders to dividends at the rate of 4½ per cent. per annum from July 1, 1927, payable semi-annually on January 1 and July 1. In accordance with the terms of the trust all certificates were guaranteed by the Southern Pacific Company.

To reimburse the treasury for the cost of construcing and acquiring certain lines of railway in the State of Oregon, and for the cost of additions thereto and betterments thereof (including the cost of acquiring the lines of railway and properties of the Oregon & California Railroad Company and of the Marion & Linn County Railroad Company, the acquisition of which was authorized by the Interstate Commerce Commission in its order dated May 27, 1927); to provide for the retirement of $15,294,000, par value, of First Mortgage Five Per Cent. Bonds of the Oregon & California Railroad Company, due July 1, 1927, which were assumed in the purchase of the property of such company; and to provide for the construction and acquisition of additional lines of railway in the State of Oregon, including extensions and branches of the lines mentioned above, and for future additions thereto and betterments thereof, the Board of Directors of your Company, on December 23, 1926, authorized an issue of bonds to be known as Southern Pacific Oregon Lines First Mortgage Bonds, limited to a principal amount of $100,000,000 at any one time outstanding, to be secured by a mortgage, dated March 1, 1927, which will be (*a*) a direct first lien on all the lines of railway (other than street railway lines) owned by the Company in the State of Oregon, aggregating approximately 1,172 miles; (*b*) a lien, subject to certain equipment trust obligations, on equipment having a depreciated book value as of February 28, 1927, of $12,936,672; and (*c*) a first lien on all after-acquired property constructed or acquired with the proceeds of any bonds issued under the said mortgage—the bonds to be issued from time to time in such amounts and to bear such rate or rates of interest as may be authorized by the Board of Directors and approved by the Interstate Commerce Commission.

In its order, dated May 27, 1927, mentioned in the paragraph next above, the Interstate Commerce Commission authorized the issue under such mortgage, of $61,294,000 of Series A Four and One-Half Per Cent. Bonds to be dated March 1, 1927, and to be payable March 1, 1977, with interest payable semi-annually on March 1 and September 1, both principal and interest to be payable without deduction for any tax or other governmental charge (other than Federal income tax) which the Company or the Trustee may be required to pay thereon or to retain therefrom under any present or future law of the United States or of any other taxing authority therein. The bonds to be redeemable as a whole, but not in part, at the option of the Company, upon sixty days notice, at 105 and accrued interest, on any semi-annual interest date up to and including March 1, 1972, and thereafter at a premium equal to one-half of one per cent. for each six months between the date designated for redemption and the date of maturity.

Of the bonds so authorized, bonds to the amount of $20,000,000 were issued and sold during the year, as set forth below, pursuant to authority of the Interstate Commerce Commission, dated June 16, 1927.

The net increase during the year in funded debt of Southern Pacific Company and Transportation System Companies *held by the public* amounted to $6,549,638.04, as follows:

Southern Pacific Company Oregon Lines First Mortgage Four and One-Half Per Cent. Bonds, Series A, issued during the year to provide funds for the retirement of $15,294,000, par value, of Oregon & California Railroad Company First Mortgage Five Per Cent. Bonds due July 1, 1927, assumed in the purchase of the properties of the Oregon & California Railroad Company taken over by the Southern Pacific Company and to reimburse the Treasury of the Company in part for capital expenditures heretofore made upon the properties covered by the mortgage					$20,000,000.00
Southern Pacific Company Four and One-Half Per Cent. Equipment Trust Certificates, Series J, issued during the year to provide for the construction and acquisition of new rolling stock					5,786,000.00
El Paso & Southwestern Railroad Company First and Refunding Mortgage Five Per Cent. Bonds owned by Southern Pacific Company, issued to the public during the year in exchange for an equal amount, par value, of bonds of El Paso & Southwestern subsidiary companies, pursuant to El Paso & Southwestern Refunding Plan approved by Interstate Commerce Commission December 26, 1923					448,000.00
Total funded debt issued to the public during the year					$26,234,000.00
Less:					
Oregon & California Railroad Company First Mortgage Five Per Cent. Bonds retired during the year:	Total	Held by Sinking Funds	Held by Public		
Bonds retired by Central Union Trust Co. Trustee, out of the sum paid to it by the United States under decree of the U. S. District Court for Oregon, mentioned on page 22 of last year's annual report	$2,143,000.00	$1,511,000.00	$632,000.00		
Bonds paid out of proceeds of sale of S. P. Co. Oregon Lines First Mortgage 4½% bonds	15,294,000.00	—	15,294,000.00		
	$17,437,000.00	$1,511,000.00		$15,926,000.00	
Southern Pacific Company Equipment Trust Certificates maturing during the year, paid off				2,613,600.00	
Central Pacific Railway Company Three and One-Half Per Cent. Bonds:					
Retired from proceeds of sale of lands			$173,500.00		
Retired from proceeds of sale of securities			353,500.00		
Retired by sinking fund			24,500.00	551,500.00	
Bonds of El Paso & Southwestern subsidiary companies, acquired from the public during the year in exchange for an equal amount of El Paso & Southwestern R. R. Co. First and Refunding Mortgage Five Per Cent. Bonds, in accordance with El Paso & Southwestern Refunding Plan, as explained above				448,000.00	
Other funded debt held by the public retired during the year				145,261.96	
Total funded debt held by the public retired during the year					19,684,361.96
Increase in funded debt held by the public					$6,549,638.04

[Advertisement]

BALANCE SHEET OF SOUTHERN PACIFIC LINES

Southern Pacific Company and Transportation System Companies, Combined

ASSETS—DECEMBER 31, 1927, COMPARED WITH DECEMBER 31, 1926, EXCLUDING OFFSETTING ACCOUNTS

Assets	December 31, 1927	+Increase —Decrease
INVESTMENTS		
Investment in road and equipment	$1,432,318,752.47	+$32,242,901.25
Improvement on leased railway property	550,829.56	+ 19,562.17
Sinking funds	20,269,304.53	— $1,569,027.03
Deposits in lieu of mortgaged property sold	1,611,613.92	— 248,736.23
Miscellaneous physical property	3,031,759.94	— 961,821.86
Investments in affiliated companies:		
Stocks	368,618,404.73	+ 1,830,241.00
Bonds	148,673,711.80	— 13,510,931.90
Stocks, Bonds } Cost Inseparable	54,297,160.15	— 110,180.00
Notes	24,763,382.02	— 855,117.32
Advances	42,161,449.01	+ 5,204,974.54
Other investments:		
Stocks	84,512.86	+ 29,227.16
Bonds	2,583,151.85	— 42,000.00
Notes	429,533.82	+ 47,687.84
Advances	37,386.62	— 27,672.16
Miscellaneous	1,085,186.46	— 46,288.80
Total	$2,100,516,139.74	+$22,002,818.66
CURRENT ASSETS		
Cash	$24,054,554.61	— $861,863.44
Demand loans and deposits	9,020,813.56	+ $9,020,813.56
Special deposits	91,752.56	— 57,316.66
Loans and bills receivable	718,344.26	+ 30,844.88
Traffic and car-service balances receivable	3,026,146.02	+ 270,527.98
Net balance receivable from agents and conductors	2,986,546.65	— 482,395.41
Miscellaneous accounts receivable	7,255,501.76	+ 507,945.52
Material and supplies	36,549,831.27	— 6,032,519.85
Interest and dividends receivable	2,575,380.23	— 519,277.24
Rents receivable	5,000.00	— 833.33
Other current assets	144,770.60	— 61,078.91
Total	$86,428,641.52	+ $1,814,847.10
DEFERRED ASSETS		
Working fund advances	$109,549.90	— $381.59
Insurance and other funds	25,360.00	—
Other deferred assets	2,338,328.47	— 49,105.03
Total	$2,473,238.37	— $49,486.62
UNADJUSTED DEBITS		
Rents and insurance premiums paid in advance	$140,848.20	— $43,152.61
Discount on capital stock	3,988,600.00	—
Discount on funded debt	2,434,092.06	+ 410,091.40
Other unadjusted debits	10,640,192.02	— 1,110,368.80
Securities issued or assumed — Unpledged (a)	2,179,575.00	+ 21,000.00
Securities issued or assumed—Pledged (a)	101,250.00	—
Total	$17,203,732.28	— $743,430.61
Grand total	$2,206,621,751.91	+$23,024,749.17

(a) Excluded from total assets, and a corresponding amount excluded from outstanding funded debt, in accordance with regulations of the Interstate Commerce Commission.

LIABILITIES—DECEMBER 31, 1927, COMPARED WITH DECEMBER 31, 1926, EXCLUDING OFFSETTING ACCOUNTS

Liabilities		December 31, 1927	+Increase —Decrease
CAPITAL STOCK			
Southern Pacific Company	$372,380,905.64		
Transportation System Companies	398,029,900.00		
Total	$770,410,805.64		
Held by the public		$372,402,765.64	— $3,550.00
Held within the system		398,008,040.00	+ 3,550.00
Total stock		$770,410,805.64	—
Premium on capital stock of Southern Pacific Company		$6,304,440.00	—
Total		$776,715,245.64	—
GOVERNMENTAL GRANTS			
Grants in aid of construction		$349,754.43	+ $349,754.43
LONG TERM DEBT			
Funded Debt unmatured:			
Southern Pacific Company	$239,575,185.00		
Transportation System Companies	497,320,081.65		
Total	$736,895,266.65		
Held by the public		$605,817,626.40	+ $6,549,638.04
Held within the system		131,077,640.25	— $6,942,000.00
Total funded debt		$736,895,266.65	— $392,361.96
Nonnegotiable debt to Affiliated Companies:			
Open accounts		46,581,409.17	+ $5,583,818.08
Total		$783,476,675.82	+ $5,191,456.12
CURRENT LIABILITIES			
Loans and bills payable		$18,715.05	—
Traffic and car-service balances payable		5,284,037.16	— $635,625.22
Audited accounts and wages payable		15,795,584.12	— 4,501,833.64
Miscellaneous accounts payable		1,455,996.36	+ 1,213.16
Interest matured unpaid		273,717.05	— 40,268.00
Interest payable January 1st		3,800,622.50	— 402,015.00
Dividends matured unpaid		48,291.21	— 21,748.80
Dividends payable January 1st		5,585,713.50	— .08
Funded debt matured unpaid		90,000.00	+ 76,000.00
Unmatured dividends declared		—	— 250,000.00
Unmatured interest accrued		6,506,466.91	+ 232,001.75
Unmatured rents accrued		144,825.10	+ 1,271.62
Other current liabilities		817,703.17	— 121,702.68
Total		$39,821,672.13	— $5,662,706.89
DEFERRED LIABILITIES			
Other deferred liabilities		$306,451.25	— $48,179.38
UNADJUSTED CREDITS			
Tax liability		$8,559,348.92	+ $3,837,774.78
Insurance and casualty reserves		3,120,117.20	— 545,043.89
Accrued depreciation—Road		2,757,027.23	+ 249,945.95
Accrued depreciation—Equipment		103,945,838.98	+ 9,024,227.30
Other unadjusted credits		42,116,099.45	— 831,944.29
Total		$160,498,431.78	+$11,734,959.85
CORPORATE SURPLUS			
Additions to property through income and surplus		$9,304,621.37	+ $354,108.83
Funded debt retired through income and surplus		24,865,518.52	— 2,079,548.33
Sinking fund reserves		19,480,863.16	— 834,952.17
Miscellaneous fund reserves		—	— 52,802.45
Appropriated surplus not specifically invested		3,818,177.83	—
Total appropriated surplus		$57,469,180.88	— $2,613,194.12
Profit and loss—Balance		387,984,339.98	+ 14,072,659.12
Total corporate surplus		$445,453,520.86	+$11,459,465.00
Grand total		$2,206,621,751.91	+$23,024,749.13

Investment Assets—Southern Pacific Lines

The following is a brief description of the investment assets of the Transportation System reported in the balance sheet, viz:

INVESTMENT IN TRANSPORTATION PROPERTY $1,432,869,582.03

Book value of investment in transportation property carried on the books of the companies comprising the Transportation System, consisting of 13,533 miles of first main track, 956 miles of additional main tracks, 5,757 miles of yard tracks and sidings, the Company's terminals at Galveston, a ten-story office building in San Francisco, 2,448 locomotives, 2,896 passen-gen-train cars, 82,213 freight-train cars, 5,860 company service cars, 22 ocean steamships, 3 river steamships, 13 automobile ferry boats, 14 passenger ferry and car transfer boats, 11 tugs, 77 barges, and 18 other vessels, the whole forming a transcontinental system extending from New York via New Orleans and Galveston, to San Francisco, California, and to Portland, Oregon, with a line extending from Ogden, Utah, to San Francisco, California.

SINKING FUNDS 20,269,304.53

Sinking funds for the redemption of outstanding funded debt, consisting principally of $18,618,000 par value, bonds of Transportation System Companies $1,885,000. par value bonds of other companies, and $224,986.25 cash in hands of Trustees.

MISCELLANEOUS PHYSICAL PROPERTY 3,031,759.94

Book value of terminal and other real estate acquired in anticipation of future use.

INVESTMENTS IN AFFILIATED COMPANIES 638,514,107.71

Investments in securities of Transportation System Companies, which are included in the outstanding obligations as shown by the balance sheet, but which are owned within the system;

Investments in securities of, and advances to, Solely Controlled Affiliated Companies and Jointly Controlled Affiliated Companies collateral to, but not a part of, the Transportation System, representing, principally, investments as follows:

Electric Railways in California (full ownership), operated mileage 886.18

[ADVERTISEMENT]

Steam Railways (full ownership), operated mileage	1,536.88
Steam Railways (half ownership), operated mileage	738.01
Total operated mileage of railways collateral to, but not a part of, the Transportation System	3,161.07

Lumber Companies (full ownership), owning 21,749 acres of timber lands, 44,743 acres of other lands, 2 saw mills, etc. Average annual production of manufactured lumber, 33,000,000 feet B.M., and of railroad ties, 8,000,000 feet B.M.;

Land Companies (full ownership), owning 9,222,048 acres of lands in various states traversed by the Southern Pacific Lines; and 6,009 town lots. Of these town lots, 2,941 are located in the State of Texas; 658 in the State of Nevada; and 2,410 in the State of California of which 977 are located in Los Angeles and vicinity;

Coal Companies (full ownership), owning 22,688 acres of coal lands in Oregon and Colorado, 6,321 acres of prospective coal lands in Texas, and 2,502 acres of lignite, clay, and other lands in Texas and Louisiana;

Oil Companies (full ownership), owning 2,444 acres (including 1,806 acres fully owned and 638 acres jointly owned), and holding under lease 12,129 acres, of producing and prospective oil lands in Texas and Louisiana, together with ownership of mineral rights in 85,443 acres of prospective oil lands in Texas. Number of producing wells, 150. Annual production, about 3,400,000 barrels;

Terminal Companies (full ownership), owning 25 acres of land in the City of Los Angeles, California, with improvements, including three two-story market buildings, and one seven-story, two six-story, and one four-story warehouse buildings situated on the line of Southern Pacific in the heart of the wholesale district of Los Angeles;

Rockaway Pacific Corporation (full ownership), owning about 565 acres of land on Jamaica Bay, near Brooklyn, N. Y.;

Southern Pacific Building Co. (full ownership), owning a nine-story office building at Houston, Texas;

Southern Pacific Motor Transport Company (full ownership), owning 23 motor coaches operating over six different interurban routes, aggregating 501 miles; 16 motor buses operating in Salem, Oregon; and 10 motor buses operating in Eugene, Oregon. Although this company operates independently, its service is coordinated with, and constitutes an extension of, the steam train service of your Company's transportation lines;

Associated Pipe Line Co. (one-third ownership), owning 561 miles of oil pipe line serving California oil fields;

Pacific Fruit Express Co. (half ownership), operating 38,608 refrigerator cars serving Southern Pacific, Union Pacific, and Western Pacific lines; and

Stock interest, as indicated, in following companies operating railroad terminal facilities:

- El Paso (Texas) Union Passenger Depot Co., 50 per cent;
- Ft. Worth (Texas) Union Passenger Station Co., 50 per cent;
- Northern Pacific Terminal Co. (Portland, Ore), 20 per cent;
- Ogden (Utah) Union Railway & Depot Co., 50 per cent;
- Union Terminal Co. (Dallas, Tex.) 12.50 per cent.

OTHER INVESTMENTS	5,831,385.53

Of this amount, $1,320,281.62 represents cash in hands of Trustee to be applied in payment for new equipment; and the remainder represents, principally, investments in outside securities.

Total Investments	$2,100,516,139.74

Road and Equipment—Southern Pacific Lines

The increase during the year in Investment in Road and Equipment of the Transportation System, as shown in the balance sheet, amounted to $32,242,901.25 as follows:

Expenditures for Road Extensions	$4,841,718.74	
Expenditures for Rolling Stock	11,341,020.93	
Expenditures for Floating Equipment	3,255,355.53	
Expenditures for Other Additions and Betterments	20,565,748.82	
Total Expenditures		$40,003,844.02
Deduct		
Property retired, equipment vacated, and other adjustments		7,760,942.77
Net increase in Investment in Road and Equipment		$32,242,901.25

The following table shows the number of units of each class of rolling stock owned at December 31, 1927, and at December 31, 1926, and the number of units of each class added and retired during year:

Class	Owned Dec. 31, 1927	Owned Dec. 31, 1926	Changes During the Year Added	Changes During the Year Retired
Locomotives	2,448	2,454	21	27
Passenger-train cars	2,896	2,910	136	150
Freight-train cars	82,213	80,603	2,622	1,012
Work equipment	5,860	5,942	398	480

To provide for increased requirements and to replace vacated equipment, your Company has arranged for the construction at Company shops, and for the purchase from outside builders, of rolling stock as follows, viz:

	Company Shops	Outside Builders	Total
Locomotives	8	16	24
Passenger-train cars	—	68	68
Freight-train cars	615	425	1,040
Company service equipment	—	29	29

The estimated cost of this equipment is $7,400,000.

In addition to the above rolling stock, the Pacific Fruit Express Company (which is owned one-half by Southern Pacific Company and one-half by Union Pacific R. R. Co.) is arranging to add to its rolling stock, during 1928, by the purchase of 2,000 refrigerator cars at an estimated cost of $5,600,000.

Including the Southern Pacific's one-half of the Pacific Fruit Express equipment, the total estimated cost of the new rolling stock mentioned above, which is in addition to equipment completed and placed in service during 1927, amounts to $10,200,000.

The ocean going passenger and freight steamer (Dixie) mentioned in last year's report, was launched on July 29, 1927, and entered the New York-New Orleans steamship service of your Company in January, 1928. The three automobile ferry steamers for service between San Francisco and Oakland, mentioned in last year's report (which were christened Fresno, Stockton, and Tahoe, respectively), were completed and placed in service during the year.

Your Company's freight steamship El Sol, en route from Galveston to New York, was rammed by a Shipping Board vessel and sunk in New York Bay on March 11, 1927. She was fully covered by insurance.

Balance Sheet and Income Account of Solely Controlled Affiliated Companies

Below will be found a condensed balance sheet as of December 31, 1927, and a condensed income account for the year 1927, of all separately operated Solely Controlled Affiliated Companies, combined:

BALANCE SHEET	Dec. 31, 1927
ASSETS	
1. Property investment	$250,769,464.14
2. Sinking funds	292,869.93
3. Investments in affiliated companies—Stocks	248,701.37
4. Investments in affiliated companies—Bonds	506,317.00
5. Investments in affiliated companies—Advances	36,838,819.14
6. Other investments	14,080,898.73
7. Cash	1,402,958.33
8. Accounts receivable	3,782,777.97
9. Material and supplies	5,005,305.18
10. Merchandise	1,163,258.92
11. Deferred assets	2,506,870.52
12. Discount on securities	11,299,214.13
13. Other unadjusted debits	19,644,520.20
14. Grand total	$347,541,975.56
LIABILITIES	
15. Capital stock	*$149,361,668.00
16. Premium on capital stock	535,151.75
17. Funded debt:	
(a) Held by the public $31,547,000.00	
(b) Held within the system 30,224,000.00	
(c) Total	61,771,000.00
18. Nonnegotiable debt to affiliated companies	62,526,709.17
19. Current liabilities	4,283,801.31
20. Deferred liabilities	95,126.59
21. Accrued depreciation	13,035,877.44
22. Reserve for amortization of property investment	9,463,574.30
23. Other unadjusted credits	11,735,697.24
24. Total liabilities	$312,808,605.80
25. Additions to property through income and surplus	$1,319,667.37
26. Sinking fund reserves	332,866.52
27. Appropriated surplus not specifically invested	700,000.00
28. Profit and loss—Balance	32,380,835.87
29. Total corporate surplus	$34,733,369.76
30. Grand total	$347,541,975.56

INCOME ACCOUNT	Year Ended Dec. 31, 1927
31. Operating revenues	$37,937,627.41
32. Operating expenses (including depreciation)	29,185,154.85
33. Net revenue from operations	$8,752,472.56
34. Taxes	2,763,587.20
35. Uncollectible railway revenues	107.05
36. Equipment and joint facility rents—Net	461,639.72
37. Net operating income	$5,527,138.59
38. Nonoperating income	922,151.43
39. Gross income	$6,449,290.02

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40.	Interest on funded debt	$3,044,956.35
41.	Other deductions from gross income	1,107,661.33
42.	Total deductions	$4,152,617.68
43.	Net income	$2,296,672.34
44.	Income applied to sinking and other reserve funds	$30,090.00
45.	Income balance transferred to credit of profit and loss	$2,266,582.34

* The amount of outstanding capital stock includes $1,300 owned by Directors and $51,110 owned by the public; the remaining $149,309,258 being owned within the system.

Claim for Closing Colorado River Break

On page 20 of last year's report, mention was made of a suit which your Company, by authority of an Act of Congress, had brought in the Court of Claims, Washington, D. C., to enforce its claim against the Government of the United States for expenditures incurred twenty-one years ago, at the instance of President Roosevelt, in closing a break in the Colorado River, to protect the Imperial Valley.

The taking of testimony has been completed, and the case is now closed and ready for findings by the United States Court of Claims Commissioner before whom the testimony was taken.

As a result of facts brought out in the testimony the amount of our claim against the Government has been increased from $1,113,677.42 to $1,197,255.17.

It is the intention to deduct from the total expenditures made by the Southern Pacific Company in closing the break, that proportion of such expenditures which the value of Southern Pacific Company's holdings in the Imperial Valley bears to the value of all property in the Valley, which was saved by closing the break. The principal matter in dispute is the question as to the basis that should be used in determining such value.

It is hoped that the final decision of the Court of Claims will be rendered in time to permit the amount of the judgment in your company's favor to be included in the second Deficiency Appropriation Bill to be submitted for passage to the present session of Congress.

Acquisition of Joint Control of the Central California Traction Company

Because of our direct interest in the Central California Traction Company, your Company made application to the Interstate Commerce Commission for authority to acquire sole control of that line by purchase of its stocks and bonds.

The Atchison, Topeka and Santa Fe Railway Company and the Western Pacific Railroad Company intervened in the proceedings, and on August 5, 1927, the Commission entered an order approving your Company's application, upon the express condition that your Company admit the Atchison, Topeka and Santa Fe Railway Company and the Western Pacific Railroad Company to joint and equal control, upon the payment by each of said companies of one-third of the cost of the securities to be acquired. This condition was agreed to by your Company with the modification that, prior to the consummation of arrangements for such joint control, the Central California Traction Company should sell its street car lines in the City of Stockton, California, to the Stockton Electric Railroad Company, a wholly owned Southern Pacific subsidiary, which had been operating such street car lines under lease for a number of years.

The arrangement, modified as set forth above, was approved by the Commission in an order dated November 28, 1927, and was consummated in January, 1928.

The Central California Traction Company is a freight and passenger electric railway operating between Sacramento and Stockton, California, with a branch from Lodi Junction to Lodi, California, a total of 55 miles, and under joint control it will continue to be operated as an independent line.

Proposed New Lines in Southern Oregon and Northern California

On page 22 of the annual report for 1925, was presented your Company's plan for the development of the country in Southern Oregon and Northern California, lying generally to the east of the Natron Cut-Off route between San Francisco and Portland, now styled "Cascade Line on Shasta Route;" and on pages 20, 21, and 22 of last year's annual report, a comprehensive explanation was given of the progress that had been made in the accomplishment of such plan.

One of the properties, the acquisition of which was contemplated in the plan, was the Oregon, California & Eastern Railway, extending from Klamath Falls to Sprague River, Oregon, and on July 22, 1927, with the approval of the Interstate Commerce Commission, your Company acquired control of this railway by the purchase from Mr. Robert E. Strahorn, the builder of the road, of his one-half of the capital stock of the company, your Company having previously acquired the other one-half of the stock of such company from Mr. Strahorn.

Mention was made in last year's report, of the fact that the situation had been complicated by the application of the Oregon Trunk Railway for authority to extend its line from Bend, Oregon, south to Klamath Falls, Oregon, and by the Commission's ruling that while the Oregon Trunk should be given access to Klamath Basin, there should be no duplication of facilities, and, therefore, that the Oregon Trunk should be granted joint use of your Company's Cascade Line between Paunina and Klamath Falls; that although your Company had used every effort to come to some agreement with the Oregon Trunk for such joint use, it had been unable to do so; and that in compliance with the ruling of the Commission, issued on February 15, 1927, your Company had presented to the Oregon Trunk Railway Company and filed with the Commission, a complete draft of contract covering the proposed joint use of the Cascade Line between Paunina and Klamath Falls, the terms theretofore offered to the Oregon Trunk being modified in such contract to accord with the suggestions of the Commission. Subsequent to the publication of last year's report, the contract then offered to the Oregon Trunk was rejected by that company. Following this rejection by the Oregon Trunk Railway of the contract offered to it, negotiations were entered into between your Company and the Great Northern Railway Company, substituted for the Oregon Trunk Railway by permission of the Commission, and on November 18, 1927, your Company and the Great Northern Railway Company, subject to the approval of the Commission, executed two agreements, as follows:

(1) Agreement under the terms of which the Great Northern Railway Company will acquire an equal interest with the Southern Pacific in the Oregon, California and Eastern Railway Company, by the purchase from Southern Pacific of one-half of the issued and outstanding capital stock of the Oregon, California and Eastern, and by the performance of other payments and agreements provided for; the cost of such acquisition to the Great Northern to be the same as it would have been if said company had joined originally on equal terms with the Southern Pacific in the purchase of stock of the Oregon, California and Eastern from Robert E. Strahorn, and had shared equally in performing the obligations in respect thereof or incidental thereto. The agreement further provides for the Oregon, California and Eastern to be operated independently for the joint benefit of the Southern Pacific and the Great Northern.

(2) Agreement under the terms of which the Southern Pacific grants to the Great Northern

(a) The equal joint use of the Cascade Line of the Southern Pacific, including telegraph and telephone lines, from a connection with the extended line of the Great Northern near Chemult, Oregon, to a point in the northerly part of Klamath Falls, Oregon, a total distance of about 72 miles. For the privilege of the joint use of said line the Great Northern will pay your Company annually, as rental, one-half of five per cent. interest on a valuation of the line amounting to $5,400,000, and one-half of five per cent. on the actual cost to the Southern Pacific of all improvements, betterments, and additions to the property made subsequent to June 30, 1927, except that the cost of improvements which, in major part, are made to effect operating economies, such as a change in grade or in line, etc., shall be shared by the two companies on the basis of use. The expenses incurred in maintaining and operating the joint line are to be shared on the basis of the relative use thereof by each company. Branch lines, which one user of the property may be legally authorized to construct, shall be allowed to make connections with the joint line, and the other user may, within five years from the start of construction, acquire an equal interest in such branches.

(b) The right to use your Company's line from the end of the joint track in the northerly part of Klamath Falls, referred to in (a), above, through Klamath Falls, a distance of about two and one-half miles, as a bridge line to reach the Great Northern's terminal property at Klamath Falls, including the use of telegraph and telephone lines and a suitable siding. For the privilege of using said bridge line, the Great Northern will pay to the Southern Pacific annually, as rental, one-half of five per cent. interest on a valuation of the line amounting to $210,000, and one-half of five per cent. on the actual cost to the Southern Pacific of all improvements, betterments, and additions to the property made subsequent to June 30, 1927, except that the cost of improvements which, in major part, are made to effect operating economies, such as a change in grade or in line, etc., shall be shared by the two companies on the basis of use. The expenses incurred in maintaining and operating the bridge line are to be shared on the basis of the relative use of such line by each company.

The conclusion of the arrangements provided for in these agreements was authorized in orders of the Interstate Commerce Commission, in Finance Dockets Nos. 6384 and 6385, issued January 24, 1928.

The Great Northern completed the extension of its line from Bend to Chemult, Oregon, on November 30, 1927, but the connection of such extension with the joint line from Chemult to Klamath Falls, Oregon, was not made until after receipt of the Commission's authorizations referred to in the preceding paragraph. It is anticipated that use of the joint line and of the bridge line, and the payment of rental therefore by the Great Northern will commence shortly.

In the meantime, the work of changing the track of the Nevada-California-Oregon Railway from narrow gauge to

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standard gauge between Alturas, California, and the southern terminus of the line at its connection with the Southern Pacific at Wendel, Nevada, 101 miles, was completed during the year, and train service with standard gauge equipment was commenced on October 24, 1927. Nearly 10 additional miles of track from Alturas, California, north, was changed to standard gauge before the end of 1927, leaving 45 miles to the northern terminus at Lakeview, Oregon, to be changed to standard gauge in 1928, weather conditions having prevented the completion of the work during the winter.

Construction of the line extending from Klamath Falls, Oregon, through Cornell, California, to a connection with the Nevada-California-Oregon Railway near Alturas, California, mentioned on page 22 of the 1925 annual report, was commenced within the time prescribed in the order of the Interstate Commerce Commission, dated May 3, 1927, by grading several miles of the roadbed. The construction of this line has not been continued, however, pending review of the changed circumstances brought about by the entry of the Great Northern into Klamath Basin.

Southern Pacific Motor Transport Company

As stated elsewhere in this report, the continued growth of automobile competition, especially in passenger traffic, has been such as to cause a steady decline in the passenger revenue of your Company during the past four years, notwithstanding a condition of prosperity which has brought a steady increase in the revenues from all other classes of service. The improvement of the service and equipment of automobile transportation companies through coordination and consolidations, together with the continued construction, extension, and improvement of the public highways in the territory served by your lines, has brought about a competition which has made it unprofitable, in certain instances, to operate steam trains engaged in local short-haul and branch line service.

To meet these conditions, and to avoid a curtailment of the service to the public in the instances referred to above, your Company caused the incorporation, in April, 1927, of the Southern Pacific Motor Transport Company, all of whose capital stock is owned by your Company. In anticipation of public demands, now existing or which may arise in the future, the new company is empowered to engage in all forms of transportation and of common carrier service, but, for the present, its plans contemplate an automobile or motor coach transportation of passenger, baggage, mail, and express business, which will be coordinated with, and act as an extension of, the steam train service of your Company's lines.

The new company, which has an independent operating organization, is at present operating twenty-three motor coaches over six different interurban routes aggregating 501 miles, and, in addition, is operating sixteen motor buses in Salem, Oregon, and ten in Eugene, Oregon, giving city service in both places. Additional motor coach service will be developed through the opening of new routes as the need arises, following a policy, however, of retaining as much travel as practicable to our steam rail lines, with a minimum use of the public highways, to produce the most satisfactory net results to our interests as a whole.

Because of the popular demand therefor, and owing to its greater flexibility and to its coordination with the steam train schedules of your lines, the motor coach service already established is not only furnishing improved passenger service, but it has enabled your Company to abandon, or to curtail, the unprofitable steam train service on certain of its branch lines.

Acquisition of the Properties of the Oregon & California Railroad Company and of the Marion & Linn County Railroad Company

In accordance with agreements dated December 27, 1926, between the Oregon & California Railroad Company and the Marion & Linn County Railroad Company, on the one hand, and the Southern Pacific Company, on the other hand, your Company, under the authority of Interstate Commerce Commission's order, dated May 27, 1927, took over as of January 1, 1926, the properties of the two companies first mentioned (all of whose capital stocks were owned by your Company), which properties, for many years, had been operated by your Company under leases.

This transfer was made in order to simplify the corporate structure of your Company preliminary to refunding the $17,437,000 of Oregon & California Railroad Company First Mortgage Five Per Cent. Bonds maturing on July 1, 1927.

As explained under the head of Funded Debt the Commission, in the same order, authorized an issue of Southern Pacific Company Oregon Lines First Mortgage Four and One-Half Per Cent. Bonds, a portion of which were used to retire the Oregon & California Railroad Company First Mortgage Five Per Cent. Bonds which remained outstanding at the date of their maturity on July 1, 1927, thus effecting a considerable saving in the annual charge for interest on funded debt.

Extension of San Antonio and Aransas Pass Railway Into Rio Grande Valley

On page 23 of last year's annual report, mention was made of certain new lines which the Interstate Commerce Commission had authorized to be constructed by the San Antonio and Aransas Pass Railway Company, extending from Falfurrias, Texas, southerly into the Rio Grande Valley of Texas. Both of the lines mentioned were completed during the year, regular freight and passenger service between Falfurrias and McAllen having been established on February 6, 1927, and between Edinburg and Harlingen, on March 20, 1927.

Authority to extend the Harlingen Branch from Harlingen to Brownsville, Texas, a distance of approximately 30 miles, application for which was made to the Interstate Commerce Commission on October 21, 1926, as mentioned in last year's report, was granted by the Commission on May 13, 1927. The grading of this line was commenced on June 18, 1927, and by October 22, 1927, the laying of rail into the terminus at Brownsville was completed. Regular freight and passenger service between Harlingen and Brownsville was established on November 10, 1927.

The territory reached by these extensions, which is said to contain the richest and most productive soil of any agricultural section in this country, has been retarded in development because of the lack of transportation facilities. It is expected that the completion of these lines will aid in the rapid development of this territory, and that your lines will gain a large amount of very profitable traffic.

Flood Conditions in Louisiana

Unprecedented rainfall over the entire valley of the Mississippi River and its tributaries during the early part of the year, resulted in a series of crevasses from Cairo to below New Orleans, and the flooding of approximately 30 per cent of the total area of the State of Louisiana.

About 94 miles of the Baton Rouge, Port Barre, and Alexandria Branches of your Company were inundated, your Company sustaining considerable damage to property, and also a loss in revenues owing to interrupted train service, to crop failures, and to other conditions caused by the floods. The main line between Algiers and Lafayette was seriously threatened in a number of places, but service was not interrupted. This line at one time was the only through route open from New Orleans to the West, and in addition to its own train service it accommodated, through detour arrangements, the trains of three other railroads whose lines were under water.

During the distressing flood period, your Company and its employees rendered every aid and service possible in rescue and relief work, and also cooperated with the various National and local governmental agencies and other organizations in the work of furnishing service and accommodations for the unfortunate refugees, their livestock, and effects, as well as in the work of returning them to their homes after the flood had receded.

The officers of your Company are keeping closely in touch with the various plans that are being advanced and considered for future protection of this territory, as your Company is greatly interested in seeing that prompt and effective measures are taken to prevent a recurrence of such disastrous floods.

Southern Pacific Railroad Company of Mexico

At the time of publishing last year's annual report, it was thought that the 4.11 miles of track remaining to be constructed in order to complete the 102 miles of main line between Tepic and La Quemada would be completed early in 1927. This expectation was realized, and the new line, completely ballasted, was placed in operation on April 17, 1927. Since the completion of the line, however, the service has been interrupted by slides, which are always to be expected on new lines in mountainous country, especially during the rainy season. This condition has been controlled, but because of the unsettled condition of the country the service has been further interfered with, at various times during the year, by the burning of trestles, the pulling up of rails, and other depredations by bandits and Yaqui Indians; and in December, a record flood of the Fuerte River washed out a trestle and bridge near San Blas, interrupting through service for 22 days, during which time passengers, freight, and perishable express were transported across the river in boats.

The operating revenues for the year amounted to $5,801,569, an increase of $1,085,218, or 23 per cent. Because of the conditions mentioned above, however, operating expenses for the year increased $1,313,700, or to $6,090,116, so that after providing for taxes amounting to $20,994, and for equipment and joint facility rents and other operating charges amounting to

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$398,783, the operations for the year resulted in a net loss of $708,324.

Federal Valuation of Railroads

On pages 24, 25, and 26 of last year's report, mention was made of the status of the Federal valuation of your Company's properties. Since the end of last year, material progress has been made in the valuation of these properties.

During the year 1927, the Interstate Commerce Commission served on the Southern Pacific Company, tentative valuations in respect of the following properties owned and/or controlled by it:

Name of Company	Date of Tentative Valuation
1. Southern Pacific Company:	
(a) Pacific Lines (rail lines)	June 30, 1916
(b) Southern Pacific Steamship Lines	do
2. Beaverton & Willsburg R. R. Co.	do
3. Central Pacific Ry. Co.	do
4. Coast Line Ry. Co.	do
5. Fresno Traction Co.	do
6. Hanford & Summit Lake Ry. Co.	do
7. Inter-California Ry. Co.	do
8. New Mexico & Arizona R. R. Co.	do
9. Oregon & California R. R. Co.	do
10. Peninsular Ry. Co.	do
11. Porterville Northeastern Ry. Co.	do
12. South Pacific Coast Ry. Co.	do
13. Southern Pacific R. R. Co.	do
14. Tucson & Nogales R. R. Co.	do

The serving of these valuations completed the serving of tentative valuations by the Commission on all companies the lines of which are included in the Transportation System of the Southern Pacific Lines, and in each case formal protest was filed within the statutory period. In no case has a final valuation been served by the Commission.

With a view to minimizing the number of protested items to be disposed of at formal hearings, the representatives of your Company and of the Commission's Bureau of Valuation have been holding joint conferences, in an endeavor to arrive at an equitable agreement, in so far as may be possible, concerning all matters included in the various protests. After the conclusion of these conferences, which are drawing to a close, formal hearings will be held by the Commission, in respect of such of the protested matters as the representatives of your Company and of the Commission have been unable to agree upon at the conferences. It is anticipated that this plan will materially reduce the time required for formal hearings.

The matter of tentative valuations covering the properties of separately operated Solely Controlled and Jointly Controlled Affiliated Companies, is receiving active attention, with a view to expediting the completion of such valuations as much as possible.

It is the intention of the Interstate Commerce Commission to proceed at an early date to bring their valuations down to date, and plans are being formulated by the Commission to accomplish this object. These plans, however, are only in a tentative state, and it is not yet known how the Commission proposes to bring the valuations to date or how long it will take to accomplish this task.

In connection with the Federal valuation work, your Company has expended to December 31, 1927, the sum of $8,525,311, of which $1,124,553 was expended during the current year.

General

The dividends for the year, on the capital stocks of the Southern Pacific Company and its Transportation System Companies held by the public, amounted to $22,342,929.00 as follows:

Dividends on capital stock of the Southern Pacific Company:		
1½ per cent. paid April 1, 1927	$5,585,713.50	
1½ per cent. paid July 1, 1927	5,585,713.50	
1½ per cent. paid October 1, 1927	5,585,713.50	
1½ per cent. payable January 3, 1928	5,585,713.50	
Total Southern Pacific Company		$22,342,854.00
Dividends on stocks of Transportation System Companies held by the public		75.00
Total dividend payments for the year		$22,342,929.00
The total taxes for the year, of the Transportation System and of all separately operated Solely Controlled Affiliated Companies, amounted to		$23,977,099.55

Under the pension system put into effect January 1, 1903, there were carried on the pension rolls at the end of the year 1,892 employes. The payments to pensioners for the year amounted to $1,095,586.12, equivalent to six per cent. per annum on an investment of $18,259,768.67.

The Board announces with sorrow the death, on May 23, 1927, of Mr. Henry E. Huntington, who served your Company as a Director from April 6, 1892, to the time of his death; and on February 28, 1927, of Mr. William F. Herrin, Vice President and Chief Counsel, who entered the service in 1893.

The Board gratefully acknowledges its appreciation of the loyal and efficient services rendered by officers and employes during the year.

By order of the Board of Directors,

HENRY W. DE FOREST,

Chairman of the Executive Committee.

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Financial News

(*Continued from page 769*)

May. 31, 1928; and for the second installment August 31, 1928. Warrants will be mailed to the stockholders, informing them of the number of shares of new stock to which they will be entitled to subscribe. Stockholders who pay for their shares in full on May 31, 1928, will be entitled to participate in all dividends thereafter declared.

To the stockholders who pay for their shares in installments interest will be allowed on the first installment at the rate of 5 per cent until August 31, 1928.

The new capital received from the sale of this stock will be used to pay for additions, betterments and improvements to the railroad equipment, property and facilities operated by the company; to pay off and retire equipment trusts and other obligations and to reimburse the treasury for similar expenditures heretofore made and for other proper corporate purposes.

The equipment trusts, mortgages and other obligations of the company, maturing during 1928, amount to over $16,000,000. Through their payment, fixed charges will be reduced by $773,000 per annum. In addition, this program contemplates the redemption on July 1 next of Pennsylvania Railroad 6 per cent equipment trust certificated of 1920, issued for equipment purchased during Federal control, which will require about $28,000,000. The redemption of these equipment trust certificates will reduce the principal of annual maturities by $3,894,000 between 1929 and 1935, and will effect an average annual reduction in interest payments of $885,000.

The statement giving these details issued by President Atterbury further says that the last allotment of capital stock was made in April, in 1913. Since then the capital requirements of the Pennsylvania have been met chiefly through the issue of bonds and equipment trust certificates. During that period the property investment has increased $603,000,000 and the book value of securities owned has increased $155,000,000, a total of $758,000,000. However, the company pursued a conservative policy of financing, with the result that the net increase in securities issued for improvements and treasury assets has been only $351,000,000.

When the stock authorized to-day has been paid for, the total outstanding stock of the Pennsylvania will be $580,000,000 and its total bond obligations, including equipment trust certificates, $555,000,000.

"As far as the sale of new stock to the employees is concerned, the statement says, "they, through their own organization, have been purchasing stock for several years. The management now proposes, for the first time, when the stockholders shall have approved, to give an opportunity directly to the employees to become owners of the stock of the Company. This action of the directors was taken (1) in recognition of the part those on its payrolls have taken in the restoration of the company's earning power, and of the deep interest and loyalty they have displayed in the improvement of the passenger and freight service offered to the public; and (2) in the belief that ownership of stock in the company from which they derive their livelihood, will increase their feeling of responsibility and be an additional inducement to persevere in their efforts to preserve the company's service at the highest standards, from which they and the entire body of stockholders will benefit.

Average Price of Stocks and of Bonds

	Mar. 27	Last week	Last year
Average price of 20 representative railway stocks	122.05	120.61	108.48
Average price of 20 representative railway bonds	96.85	97.22	94.20

Dividends Declared

Carolina, Clinchfield & Ohio.—Common, 1 per cent, quarterly; stamped certificates, 1¼ per cent, quarterly, both payable April 10 to holders of record March 31.

Providence & Worcester.—2½ per cent, quarterly, payable March 31 to holders of record March 14.

Kansas City Southern.—Preferred, $1, quarterly, payable April 16 to holders of record March 31.

Officers

Executive

Warren S. Palmer resigned on February 18 as president and general manager of the Northwestern Pacific in view of the termination on April 30 of his active service with that company under the age limit rule. Mr. Palmer will reach his seventy-first birthday several days before that time, having been born on April 25, 1858, at San Francisco, Cal. He was graduated from the college of civil engineering of the University of California in 1876 and entered railway service in the same year as an apprentice in the bridge and building department of the Central Pacific (now part of the Southern Pacific). For the next nine years he served that railroad successively as an apprentice, as a journeyman bridge carpenter, draftsman, rodman, transitman and chief of party on location and construction. In 1885 he joined the engineering department of the Southern Pacific in charge of location parties, later

Warren S. Palmer

serving as a member of the engineering and contracting firm of Palmer & Storey, San Francisco, Cal. During this time his contracting firm, constructed the Yreka, the Pajaro Valley (now the Pajaro Valley Consolidated) and the Solusa & Lake. In December, 1890, Mr. Palmer was appointed resident engineer of maintenance of way of the Western division of the Southern Pacific, with headquarters at Oakland, Cal., in addition being appointed assistant superintendent of the same division in March, 1900. From June 1, 1901, to September 1, 1907, he served the Southern Pacific as division superintendent at Sacramento, Cal., as division superintendent at Oakland Pier, Cal., and as general superintendent of the Northern district at San Francisco. Mr. Palmer was then appointed general manager of the Northwestern Pacific and on January 7, 1914, he was elected president and general manager. During federal control of the railroads he acted as general manager of the Northwestern Pacific, resuming his position as president and general manager with the return of the railroads to private operation in 1920.

Edward H. Maggard, who has been elected president and general manager of the Northwestern Pacific, with headquarters at San Francisco, Cal., was born on August 19, 1875, at Meridian, Miss., and after attending the public schools at Denison, Tex., he entered railway service when 16 years of age as a call boy on the Missouri-Kansas-

Edward H. Maggard

Texas. Later he became a clerk in the local freight office of the Katy at Houston, Tex., also serving in the same capacity with the Southern Pacific, the International-Great Northern and the Houston East & West Texas (now a subsidiary of the Southern Pacific). In 1900 Mr. Maggard was appointed superintendent of terminals of the El Paso & Southwestern (now part of the Southern Pacific), becoming general freight and passenger agent of the Petaluma & Santa Rosa, with headquarters at Petaluma, Cal., in 1907. He was elected vice-president and general manager of this electric railroad in 1912 and president and general manager, with headquarters at Petaluma, in 1925. Mr. Maggard's election as president and general manager of the Northwestern Pacific became effective on February 18. He retains the presidency and the general managership of the Petaluma & Santa Rosa.

Financial, Legal and Accounting

Phineas B. Lacy, assistant treasurer of the Northern Pacific, with headquarters at St. Paul, Minn., has been elected treasurer, with headquarters at the same point, effective April 2. On that date, **Horace A. Clifford,** present treasurer, will retire under the pension rules of the company after nearly 45 years of service with the Northern Pacific. Mr. Clifford was born on March 18, 1858, at Lowell, Mass. He finished his education at Norwich University where he was a student between 1874 and 1877 and entered railway service in the fall of 1879 on the Chicago, St. Paul, Minneapolis & Omaha, at Luverne, Minn. From 1881 to 1883 he was with the Chicago, Milwaukee & St. Paul at St. Paul. Mr. Clifford's service with the

Horace A. Clifford

Northern Pacific began on May 1, 1883, when he became a clerk in the office of the treasurer at St. Paul. Five years later he was advanced to cashier, being elected treasurer in 1920.

Mr. Lacy was born on April 14, 1880, at Hudson, Wis., and received his education in the public schools of Minneapolis, Minn., graduating from high school there in 1899. Until December 1, 1905 he was engaged in business in Minneapolis and was employed by the Minnesota state surveyor general of logs and lumber and on that date he entered the Northern Pacific service as a clerk in the land department. Later Mr. Lacy was advanced to cashier in the land department and then to assistant to the land commissioner. During federal control of the railroads he acted as corporate cashier of the Northern

Phineas B. Lacy

Pacific and in 1920 he was appointed cashier in the office of the treasurer at St. Paul. Mr. Lacy was promoted to assistant treasurer on June 1, 1927.

Charles N. Marland, who has been appointed treasurer of the Boston & Maine, with headquarters at Boston, Mass., was born on January 12, 1871, at Acton, Me. He attended Phillips Andover Academy from 1884 to 1888 and in July of the latter year entered railway service as a messenger for the Boston & Maine.

From 1890 until 1903 he served as station receiving teller and assistant to the paying teller on the same road. He

Charles N. Marland

was then given charge of dividends and bond transfers, being promoted to paying teller in 1914. From 1914 to February 1916 he served as assistant treasurer, which position he held until his recent appointment as treasurer.

Operating

L. W. Bowen, superintendent of the Salida division of the Denver & Rio Grande Western with headquarters at Salida, Colo., has been transferred to the Pueblo division, with headquarters at Pueblo, Colo., succeeding **William M. Neff,** who has resigned, effective April 1, to accept service with another railroad.

W. R. McPherson, trainmaster on the Denver & Rio Grade Western at Salt Lake City, Utah, has been promoted to superintendent of the Salida division, with headquarters at Salida, Colo., succeeding **L. W. Bowen,** who has been transferred to the Pueblo division, with headquarters at Pueblo, Colo. Mr. Bowen replaces **William N. Neff** who has resigned, effective April 1, to accept service with another railroad. **E. W. Deuel,** assistant superintendent at Alamosa, Colo., has been transferred to Salt Lake City to take the place of Mr. McPherson and **A. J. Broderick,** trainmaster at Grand Junction, Colo., has been transferred to Alamosa to take the place of Mr. Deuel. **Walter Allen,** chief dispatcher at Salt Lake City, has been promoted to trainmaster at Grand Junction, succeeding Mr. Broderick.

Albert G. Geuder, who has been appointed assistant general superintendent of the Pittsbugh, Shawmut & Northern, with headquarters at St. Marys, Pa., was born on December 9, 1883, at Olean, N. Y., and was educated in the public schools and at the Westbrook Commercial Academy, from which latter institution he was graduated in 1902. He entered railway service on April 20, 1902, as clerk in the division superintendent's office of the Pennsylvania at Buffalo, N. Y. Mr. Geuder entered the service of the Pittsburgh, Shawmut & Northern at St. Marys, Pa., on January 16, 1911, as a stenographer, and on January 15, 1913, was appointed chief clerk to the general superintendent. On March 1, 1924, he was appointed superintendent of transportation, and on September 1, 1927, was appointed assistant to the general superintendent, which position he was holding at the time of his recent appointment as assistant general superintendent.

James D. Beaver, who has been appointed general superintendent of the Pittsburgh, Shawmut & Northern, with headquarters at St. Marys, Pa., was born on February 5, 1875, at Beavertown, Pa., and was educated in the public schools and at LaSalle Extension University. He entered railway service on September 1, 1891, as agent and telegrapher on the Pennsylvania. From 1892 until 1898 he served consecutively as telegrapher, agent and train dispatcher on the Western New York & Pennsylvania (now the Buffalo division of the Pennsylvania). From 1898 until 1900 Mr. Beaver was train dispatcher on the Plant system of railways (now the Atlantic Coast Line), and then served in a similar capacity on the Chicago, Rock Island & Pacific until 1902. At that time he returned to the Pennsylvania, and until 1906, was successively train dispatcher, yardmaster, assistant trainmaster and train rule examiner. From 1906 until 1924 Mr. Beaver was successively trainmaster assistant superintendent, superintendent of transportation and superintendent of the Pittsburgh, Shawmut & Northern. During the following four years Mr. Beaver was out of railway service, being engaged as manager of research and engineering of the Stackpole Carbon Company, and returning to the Pittsburgh, Shawmut & Northern just previous to his appointment as general superintendent.

Hiram R. McKee, who has been promoted to superintendent of the Arkansas River division of the Atchison, Topeka & Santa Fe, with headquarters at La

Hiram R. McKee

Junta, Colo., has completed more than 17 years in the service of that railroad. He was born on July 18, 1881, at Bloomville, Ohio, and graduated from the high school in that city. He first entered railway service at the age of 14 years as a station helper on the Pennsylvania during summer vacation. Later Mr. McKee was advanced to operator and on February 1, 1901, he was promoted to train dispatcher at Toledo, Ohio. Nine years after his promotion to train dispatcher on the Pennsylvania he became a train dispatcher on the Union Pacific at Evanston, Wyo., entering the Santa Fe service in the same capacity at Las Vegas, N. M., in November, 1910. Mr. McKee was then advanced successively to chief dispatcher and trainmaster at Las Vegas. For a period of eight months during the World war he served in France as captain of Company A, 39th Engineers, returning to the Santa Fe as trainmaster at Raton, N. M., in April, 1919. In November, 1920, Mr. McKee was promoted to assistant superintendent at Dodge City, Kan., being transferred later to Las Vegas and then to Wellington, Kan. His appointment as superintendent of the Arkansas River division became effective on March 16.

Traffic

W. J. Honan has been appointed foreign freight agent of the Baltimore & Ohio, with headquarters at New York City. **J. W. Lee** has been appointed assistant foreign freight agent, with headquarters at the same point.

Edward L. Pardee, who has been promoted to general passenger agent of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul, Minn., was born on December 19, 1877, at Kilbourn, Wis. After attending both high school and business college, he entered railway service in February, 1896,

Edward L. Pardee

as an office boy in the passenger department of the Omaha at St. Paul. Later he served successively as a stenographer and clerk in the passenger department, in the baggage department and in the ticket stock department and as an advertising clerk. On March 1, 1905, Mr. Pardee was advanced to traveling passenger agent, being promoted to assistant general passenger agent, with headquarters at St. Paul, on July 1, 1911.

C. O. Williams, assistant general passenger agent of the Kansas City Southern, with headquarters at Kansas City, Mo., has been promoted to general passenger and ticket agent, with headquarters at the same point, succeeding **Samuel G. Warner** who retired on March 1 after serving nearly 28 years as general passenger and ticket agent. Mr. Warner was born in Connecticut and after attending Chase's Military College he entered railway service in 1888 as city freight and passenger agent for the St. Louis, Arkansas & Texas (now the St. Louis Southwestern) at Memphis, Tenn. Later he was appointed traveling passenger and freight agent and then southwestern passenger agent and district passenger agent, both at the same point. In 1896 he was appointed general passenger agent of the St. Louis Southwestern of Texas, with headquarters at Tyler, Tex. He held this position until his appointment as general passenger and ticket agent of the Kansas City Southern on May 1, 1900. Mr. Williams, who has been connected with the Kansas City Southern for 29 years, began his railroad service in 1898 as a telegraph operator on the Kansas City, Pittsburg & Gulf (now part of the K. C. S.). He came to the Kansas City Southern in 1899, serving as station agent at various points until 1904 when he was advanced to city passenger and ticket agent at Shreveport, La. From 1909 to 1911 Mr. Williams served as agent at the Grand Central station at Kansas City, becoming traveling passenger agent in the latter year. In 1917 he was promoted to assistant general passenger agent at Kansas City.

C. O. Williams

Engineering, Maintenance of Way and Signaling

Clinton A. Plumly, valuation engineer of the Maine Central, has been appointed assistant to the chief engineer, with headquarters at Portland, Me. The office of engineer of construction has been abolished.

Asa H. Morrill, engineer of construction and chief of the valuation committee of the Maine Central, with headquarters at Portland, Me., has been appointed chief engineer, with the same headquarters, succeeding **Bertrand T. Wheeler,** deceased.

Obituary

DR. W. F. M. GOSS

Dr. William Freeman Myrick Goss died suddenly in New York City on March 23. As an engineering educator he co-operated with and made a large contribution to the railways in the field of mechanical research and design. He was also closely related to the railway field in the later years of his active business career, as president of the Railway Car Manfacturers' Association.

Dr. Goss was born in Barnstable, Mass., October 7, 1859. Upon completion of a two-year mechanics' arts course at the Massachusetts Institute of Technology in 1879 he was appointed instructor in practical mechanics at Purdue University and organized that department. In 1883 he was made professor of practical mechanics. Purdue University, because of Dr. Goss's work at this period, was a large factor in stimulating the introduction of manual training work in American high schools. In 1889 he was given a leave of absence of about a year and a half, during which time he studied in Boston and at the Massachusetts Institute of Technology.

In 1890 Doctor Goss was appointed professor of experimental engineering at Purdue and undertook the building of a laboratory for advanced engineering work.

Dr. W. F. M. Goss

It was under his direction that the first American locomotive testing plant was established at Purdue; naturally this brought him in intimate contact with railroad mechanical department officers. The Master Car Builders' Association also made the Purdue laboratory its official testing station and installed considerable apparatus in its laboratories. Marked advances were also made in the development of laboratories and courses in materials testing, in hydraulics and in the general field of theoretical and applied thermodynamics.

In 1899 Doctor Goss was granted a year's leave of absence for travel and study abroad. Upon his return he was made dean of the schools of engineering, which position he resigned in 1907, after 28 years of service at Purdue, to become dean of the college of engineering and director of the school of railway engineering and administration at the University of Illinois. In 1909 he was also made director of the engineering experiment station. It is not surprising, in the light of his previous experience, to find a rapid growth of laboratory and experimental engineering work under his direction at Illinois, and a larger and closer co-operation between the University of Illinois and railway mechanical officers. It was while he was at Illinois that he succeeded Horace G. Burt in 1913 as chief engineer of the Chicago Association of Commerce Committee of investigation on Smoke Abatement and Electrification of Railway Terminals. In 1917 Doctor Goss gave up his work at Illinois and became president of the Railway Car Manufacturers' Association, serving in that capacity until 1925, when he retired.

Two special pieces of work were done by Doctor Goss while at Purdue, under the patronage of the Carnegie Institute at Washington, which resulted in the publication of two extensive studies, one entitled High Steam Pressure in Locomotive Service (1907), and the other, Superheated Steam in Locomotive Service (1910). The proceedings of the Master Mechanics' and Master Car Builders' Associations for many years regularly included individual papers or valuable discussions by Doctor Goss, or reports in the preparation of which he co-operated and which were largely based on experimental work carried out under his direction.

He was a member of the jury of awards in the transportation department of the World's Fair in 1893, and was chairman of the advisory committee organized by the Pennsylvania Railroad, to direct its work in locomotive testing at the Louisiana Purchase Exposition. He was for a number of years a contributing editor to the Railroad Gazette. He was a president of the Western Railway Club, and in 1913 of the American Society of Mechanical Engineers. He was the author of books on Locomotive Problems (1907), and on Locomotive Sparks (1902). He was given the honorary degree of Master of Arts by Wabash College in 1888 and the honorary degree of Doctor of Engineering by the University of Illinois in 1904.

During his retirement he lived quietly, most of the time at Barnstable, Mass. Realizing, however, the value of biographies in helping and inspiring men in their various fields of endeavor, he headed up a committee of the American Society of Mechanical Engineers, which has been formulating plans for publishing a series of biographies of outstanding mechanical engineers.

Bertland T. Wheeler, chief engineer of the Maine Central, died at his home in Portland, Me., on March 20.

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